COAL AGE

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"SAFETY FIRST!"

It is a sounding slogan, all right, and a very excellent sentiment, too. But there are a large number of employers who seem to think it is nothing more.

They stick a lot of "*Safety-First*" signs in various places in the mine and on the surface and then imagine that their duty is done.

As a matter of fact that's only a small beginning.

"*Safety First*" means just that—"SAFETY FIRST."

It means that *safety comes before speed, efficiency or profit.* It means that every possible agency for preventing accidents must be provided in the places where men must work. It means that men must be warned and protected even against the results of their own carelessness.

"*Safety First*" means that no one—boss or miner—must "take a chance." It means that if there is any doubt whether a roof will hold, it must be timbered. If there is any question as to the strength of a cable it must be replaced.

"*Safety First*" means constant, unremitting, painstaking supervision of men and machinery. It means that chutes must be well guarded, powder must be tenderly handled, ventilation must be thorough and that every possible practical appliance which will eliminate risk and reduce humanity's liability to forget or overlook shall be installed.

"*Safety First*" means that money must be spent for equipment, for close supervision, for careful training. It means that every wise provision must be made against accident or disaster—and that there must be a drilled and capable rescue corps to take charge of the grim work of recovery if disaster comes.

"*Safety First!*" is a fine slogan, but if it is really to mean anything, it must be more than that—it must be a mission, a gospel, a religion.

By BERTON BRALEY

Ideas and Suggestions

Value of Competent Mining Engineering

Among many of the smaller operators today, as in the past, the engineering department is considered an unnecessary expense. The result is a higher cost of production through a poorly designed plant and unsatisfactory equipment. As a result of keen competition in the coal business, expenses have been cut in every way possible, and the engineering work has suffered severely.

Reflection has often been cast on the mining-engineering profession throughout the coal fields of the United States because of improperly designed plants and costly methods of production. However, this will be found due to one of two causes—either the work was not given into the hands of a competent engineer, or it was restricted through lack of capital.

At many of the smaller plants the engineering work is being done by some contracting concern from a neighboring town whose corps visit the plant once or twice a month. Projected work must either be put off until the arrival of the corps or done without their aid. Consequently only the most important work receives the attention of the engineers.

Economy of operation and a large percentage of recovery are the aims of every operator, and in order to realize these ends engineers must be employed capable of laying out both the outside plant and the underground workings in a systematic manner, suitable to the conditions found.

One reason for the unpopularity of the engineer is that he must build not only for today but for the future. His plans therefore call for a better grade of work and equipment, and the operator having his eye on the expense or cost, frequently will only approve of the cheapest construction.

Many operators when about to buy a piece of machinery write to several builders and state in a general way what is needed, and when bids are received there is found to be a wide range in the size and price.

Specifications Are Necessary

In the building of a plant it is necessary that specifications be prepared if the work is to be done by contract, for otherwise it is almost certain that only the cheapest kind of work will be secured. This is true also in the purchasing of equipment, for if there are no specifications there will be no satisfaction in the end, either to the buyer or to the seller.

The value of the data collected by an engineer cannot be overestimated in the laying out and projection of a mine. It is only when this information is at hand that the cost of haulage and drainage can be reduced to a minimum. There are many mines throughout the country where these items are eating up a big share of the profit. There are others where changes have been made and better results secured, but in these cases also the cost of experimenting has been paid.

Many tons of coal and much money have been lost as a result of inaccurate surveys. Coal mining requires accurate surveys and maps both of the surface and the underground workings. These maps should show the mine workings exactly as they are, and should be brought up to date at least every six months. Meanwhile, at the end of every month, all work done during the month should be placed on the map in colored pencil. With the aid of these maps the development work can be kept in proper order, and in the retreating work the fracture line can be kept in better shape.

An engineer is needed around a coal plant at all times. Efficient and economic operation can be secured only through his aid.

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Importance of Little Things

By C. P. Shockley

"It seems to me," remarked the superintendent, "that economy does not play the important part in the operation of mines that it should, when we consider the wonderful opportunity we have to exercise it. The lack of economical methods has caused the loss of more money in the mining business than any other single feature.

"It is just as true in mining as in other lines that a dollar saved is a dollar earned, and is in truth a great deal easier to save than to earn.

"Of the large investments in equipment and improvements necessary at mines to offset wage increases and other conditions that materially influence the productive cost of coal, the effect is lost oftentimes by lax and uneconomical methods of management.

"Some officials are firmly imbued with the idea that to secure adequate returns large outlays are necessary, and entirely overlook the chances to save by careful management.

"The matter of saving in labor and supplies can of course be carried to such extremes that it will prove to be a menace, but a well-planned campaign of economy, if carefully administered, will yield good results.

"Our pitboss at No. 4 put on a heavy force last Thursday, an idle day, to clean tracks, the expense amounting to about $150. In the present state of the market, when demand for coal is light, the selling price low and work irregular, strict economy is necessary. He used this force of men to clean up the entries on the west side, where dirt had accumulated during the 'sweating season,' and argued that the cheapest way was to put on enough men to handle it in one day.

"At our No. 5 opening we have a mine similar in almost every way to No. 4, and our mine boss at this plant keeps close watch over the day men. As an illustration, when a track-layer is sent into an entry to lay a room turn, and the work is sufficient to keep him occupied for three-fourths of a shift, such a man sometimes will 'loaf on the job,' and thus lose enough time to have enabled him to finish out the shift at that place, take his

tools to the parting at quitting time and be ready to make a fresh start in some other direction in the morning.

"This foreman at our No. 5 mine has a way of dropping in on such idlers and seeing that they finish up their work promptly and clean their track in a reasonable amount of time.

"At this same mine we had a number of loaders we called 'the early quitters,' men who when the turn ran good would slip away home early in the afternoon. After some little time the foreman managed to collect these fellows in one part of the mine—and not a very desirable part at that. When they drifted out early and the drivers in that section ran out of coal, he utilized them in cleaning roads the remainder of the shift.

"Another thing that greatly helps the boss when he is short of loaders and coal is coming slow, is to carefully arrange a transportation force sufficient to handle the output, the men not necessary for that purpose being delegated to cleaning track and doing other necessary work.

"When oil barrels are emptied and stored outside the mine (to store them inside is unsafe and is prohibited by the mining laws) they usually fall to pieces before a carload is accumulated, and a wise foreman will arrange a shallow pond with the expenditure of very little money, where by storing his barrels in a damp, shady place he obtains what we could appropriately call a large percentage of recovery.

"I have seen well-managed mines show a saving in the amount of timber, ties, spikes and rails used per ton that was remarkable, owing simply to a well-defined system of removing these supplies from worked-out sections before the falling roof buried them.

"All of the foregoing considerations impress upon us the importance of the mine foreman's work and emphasizes the fact that upon his shoulders rests the responsibility for carrying out the plans that will eliminate the various sources of useless waste and develop a system that will prove economical and successful."

Cleanliness and Efficiency

By E. S. Bonnet

On a recent inspection tour of the mine plants by the "big officials" of a large coal-mining company, the president criticized some of the superintendents rather severely on the uncleanliness and generally unfavorable appearance of the camps. He ordered a tipple painted here, a boiler house cleaned there, more windows and better light in the power house at another mine, while at still another plant he ordered the scrap material picked up from around the shaft and shop buildings and placed in a pile out of the way of the workmen.

Some of the superintendents commented on the orders in this fashion: "Why, the president didn't inspect our plants at all. He doesn't know anything about mining coal. All he saw was the outside of things—that this needed painting and that needed cleaning up. I'm glad he told us to do it, for it costs money, with no returns, and I would not have spent the money otherwise, even though I like to see things look nice."

This president is a successful man and knew what he was doing when he ordered things cleaned up. It so happened that about a month after the inspection tour some important changes were ordered in one of the tipples which it had been decided to paint, and when the work started the timbers were found to be so badly decayed that the tipple had to be virtually rebuilt.

In the power house where more light and a general cleaning up was ordered a large crack was found in the engine base, which probably would have shortly put the machine out of commission. This base was intended as a catch for the oil falling from the moving parts of the engine, but it ran through the crack and was disintegrating the foundation. A new engine bed was built, the crack was welded and the oil led into a receptacle. There is enough of this oil saved already to pay for the cost of the foundation improvements.

At another mine, where scrap was allowed to accumulate around the plant, a mule which was brought out of the shaft at night became frightened at something just as he stepped off the cage and ran into an old sheave wheel lying near the shaft and broke his leg.

The Men Prefer New Mines

It usually happens that when a new mine is opened in a district already producing there is no trouble in securing men. It seems as if most of the men want to work at the new plant. The reason is that the houses are new and better to live in, while the machinery is likewise new and easier to work with.

Why should men prefer new to old things? Because generally the old things are not kept clean and in repair. Isn't it logical to suppose that a man would prefer living in a house which has been his home for some years, which is freshly painted, is warm and well lighted, with a good roof, a nice fence around the place, and a nice lawn and flowers, than to move into a new house, with its consequent mud, dirt and strangeness? Why shouldn't a man prefer a piece of machinery with which he is perfectly familiar to one entirely new and strange to him, if the old piece is kept clean and in good working order?

In the course of my duties I have to visit a number of mines. In one of them the entries are kept clean, the fallen coal is quickly picked up, the ditches are frequently cleaned out, the falls of rock are immediately hauled away and the track is well ballasted. It is a pleasure to visit this mine. In another operation, the rooms are off sights, the track is crooked, the roadways are so full of fallen coal that one day in ten motor trips I counted seven derailments.

In this mine the ditches are not kept clean, in places the rail being under 3 or 4 in. of water. I have never left this mine with dry feet, and I dread the visit and put off the inspection as long as possible.

Think this over, Mr. Mine Man, and see at which plant you would rather work—at the plant which has fresh paint, where the dirt and scrap is cleaned up, which provides bright airy buildings and clean homes and streets, or the other plant, which has not seen paint since it was built, where the workshops are dark, the entries wet and strewn with coal, the yards covered with scrap and refuse, the streets unlighted and the houses filthy.

Which camp would you rather work and live in, Mr. Miner? And which plant, Mr. Superintendent, would you rather have charge of, and which plant do you think offers the most inducements for a man to give all the best there is in him to make the mine a success?

Control and Costs of British Rescue Stations

By Professor Henry Briggs*

SYNOPSIS—The writer compares the advantages of private with central mine-rescue stations and gives the reasons which sometimes make it advisable to treat the central station mainly as a place of training and in other cases to maintain it as an actual rescue center.

The control of rescue stations in America and Great Britain must necessarily differ for many reasons. The law relating to rescue work is not the same in the two countries; the nature of the training of the men probably also differs in details; and the average area served by a station must be considerably smaller in the latter country than in the former.

In *Coal Age* for Oct. 4, 1913, for example, is to be found a description of an admirable 40-hp. mine-rescue automobile built for the Pittsburgh Bureau of Mines, and at the end of that description it is stated that the car "is to be used to travel moderate distances, from 25 up to 100 mi." If my inference is correct and the station at which this car is housed serves a radius of roughly 100 mi., then it is quite certain that our British rescue stations are planted much more thickly than those in the United States, for in this particular connection we should not hesitate to call 100 mi. an extremely long distance.

But be these differences what they may, there is, I believe, sufficient in common between the rescue-station problems of the two countries to make a short review of the British position worth while.

Should Companies Combine for Rescue Work?

Rescue training and the provision of rescue apparatus are compulsory at the coal mines of Great Britain, complete exemption being only granted for small collieries so remotely situated that they cannot be served by a central station. As a matter of fact, exemptions are few in number. The regulations in question do not apply at all to oil-shale, ironstone, or fireclay mines which fall within the scope of the Coal Mines Act; nor even to metalliferous mines.

A colliery company is given the choice of complying with these regulations either by undertaking the training of its own teams and maintaining the necessary apparatus at the mines, or by joining with other neighboring companies in providing a central rescue station to serve them all.

Many companies have made careful inquiry as to which of these alternatives is the better. It is no secret that the mine inspectors are in favor of central stations as against individualized training. The question, however, is simpler to the inspector than to the colliery owner. The former does not trouble about costs, whereas the latter must. There can be no doubt as to the greater efficiency of the training procurable at a central station, where there is an expert instructor who gives his whole time to the work. Moreover, the apparatus itself is usually maintained in better condition at a central station than at a colliery. These advantages of coöperation cannot be neglected by anyone striving to reach a sound conclusion on the question, however much he may be obsessed by costs.

If Lord Roberts' dictum that "one trained man is worth ten men untrained" be accepted for rescue work as well as in its military sense, it might with equal truth be said that one properly trained man is worth five men half trained. Work with breathing apparatus, in fact, is dangerous under the circumstances which obtain at a mine fire or after an explosion, unless the wearers of that apparatus are thoroughly skilled in its use. Again, breathing equipment should be overhauled and tested with such frequency and care that the rescuemen can depend on its being in order at all times. A faulty apparatus is more dangerous than none at all. Unless the men are sure the equipment is serviceable they cannot have full confidence in it, and their personal efficiency is reduced thereby.

To sum up, if rescue training is done at all, it must be done well, and there is a better chance that it will be so done at a central station than when each coal company acts separately and according to its own lights.

Which Costs More, Central or Private Stations?

So much for the viewpoint of efficiency. But how about the aspect of cost? Obviously, the expense of a central station is borne more easily the more there are to share it. In fact, in a district thickly strewn with collieries the central station becomes by far the cheapest way of complying with the regulations of the Home Office. On the other hand, in an area where mines are few and far between such a station may be found too expensive. There must therefore be a point at which the cost of rescue-station training and that of individualized instruction is the same.

It is interesting to determine where this point lies. We are certainly not far from it in the Edinburgh district. Here there are roughly 10,000 men employed underground in coal mines, and in all 33 brigades (each of not less than five men) must be trained to satisfy the rules. Two companies, requiring between them six brigades came to the conclusion that it would be cheaper to train their teams themselves and to maintain the requisite apparatus at the collieries. Accordingly, they bought equipment and fitted up smoke galleries, and at each mine a man is engaged for part of his time in putting the brigades through practice drill.

The other companies in the district either convinced themselves that a central station would be cheaper or found so little difference in the figures that, on the ground of greater efficiency, they were able to approve of the centralization. I incline to the belief that under the conditions obtaining in Great Britain, at any rate, a central station scheme and independent training at the different collieries will cost about the same in a district requiring about 24 brigades. The consideration of efficiency, however, makes the central station preferable even for a

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smaller district, and as examples of successful stations serving small areas mention may be made of those at Tankersley, Yorkshire, and at Wath-on-Dearne, in the same county. The former, which was the first coöperative station erected in Great Britain, is connected with only seven collieries and the latter with only nine.

There is one other appeal that can be made in favor of the rescue station—it shifts a little worry and trouble from the mine manager's shoulders. Moreover, if he has to answer before a court of law or official inquiry for the provisions he has made as to rescue work, he will be more easily able to prove that he has done his best to comply with the regulations if his colliery is associated with a rescue station than if it is not.

Should a Fixed Corps Be Kept at the Station?

Assuming that the coal companies in a district decide to combine in providing a rescue station, they are faced with another problem. How is it to be run? There is a choice between two methods, which for convenience we shall term A and B. In system A the personnel at the station consists merely of the instructor-in-charge, who usually has an assistant. The brigades, each of not less than five men, are enrolled at the collieries and are sent to the station to receive their training once a week for at least 13 weeks.

In system B a permanent brigade resides constantly at the station, ready to be despatched to any associated colliery. This permanent brigade must consist of not less than six men, the instructor and five others, or, if there are more than 15,000 underground employees at all the mines served by the station, the brigade must consist of not fewer than eight men. With such an organization, which is much akin to that of a fire station, there is no need to train nearly as many men from the collieries as is required under system A; and as will be seen by the following table, the British regulations take this fact into account:

Number of Men Employed Underground	Minimum Number of Colliery Employees to Be Trained in Rescue Work	
	System A	System B
Less than 250	5	1
250 to 700	10	3
700 to 1,000	15	
More than 1,000	20	5

With system A a group of mines belonging to one owner is treated as one mine for the purpose of ascertaining the number of men to be trained, provided the shafts or outlets lie within a circle of two miles radius. No such grouping is allowable under system B.

Which of these systems is the better is still quite an open question. If the second is to possess any superiority, it must lie in the better training that can be given to a permanent brigade of picked men, and everything must be subservient to bringing these men to a high pitch of efficiency and keeping them there. The weakness of the system is perhaps in carrying all one's eggs in a single basket.

Training Centers Cheaper Than Rescue Stations

Excellent in quality though the permanent brigade may be, it may suffer disaster, particularly if it consists of only six men. In this event a mine may be left with an insufficient reserve of trained men. The objection that a brigade housed at the station cannot know the mine as does one drawn from the employees at that mine is to some extent removed by the fact that there are, as the table shows, a few trained men at each mine capable of acting as guides.

When everything is considered the first system seems to me the cheaper as to running cost. I have had to analyze the question closely in reference to the rescue station which was recently built in connection with my department at the Heriot-Watt College, Edinburgh. In that instance the second system, had it been adopted, would have required the provision of a permanent brigade of six men. Five of these would have cost $9 per week each, while the sixth, the instructor, would have been given free quarters, coal, light and $750 per annum.

Allowing for this and all other station charges, except that of running the automobile, and adding the wages and railway fares of colliery employees undergoing training, it was estimated that the running cost for the first year would under system B be $6,090 and under system A $5,385, showing a difference in favor of the latter plan of $705. The estimated difference in first cost on the station and apparatus was nearly $15,000 in favor of system A, chiefly owing to the fact that under that plan housing accommodation for a permanent brigade did not need to be provided.

It is advisable to add that these figures are not meant to suggest any general conclusion in regard to the relative costs of the two systems. Conditions differ in every district, and estimates must vary accordingly. It is quite possible, indeed, that the running cost of a station under system B will be found actually less than under the rival system for a dense colliery area employing, say, more than 20,000 men underground within a radius of 10 mi. from the station. But the first cost must always be higher under system *B*.

How Idle Time of Rescuemen May Be Filled

Another objection to that plan is the difficulty of controlling a number of young men with so much slack time on their hands. They cannot always be practicing with apparatus or drilling in the gymnasium, and a station does not need an exceptional amount of manual labor to keep it clean and orderly. A strict, semimilitary discipline has to be maintained, and much more responsibility is thrown on those in charge.

This difficulty of an abnormal proportion of idle time has been met to some extent at the important Newcastle-on-Tyne rescue station, where the permanent brigade system has been in successful operation for a number of years. In that city the mine-rescue corps also furnish fire protection to factories and other properties. The Newcastle station is exceptionally fortunate in having been able to secure this additional work.

We in the Edinburgh district, at any rate, could not see that the advantages of the permanent-brigade system were so overwhelming as to counterbalance its drawbacks and its costliness and decided therefore in favor of system A. As a matter of fact the majority of British stations are organized under that plan, and the rest of this article is concerned with that system only.

The permanent-brigade system is in operation, however, at the Newcastle station already mentioned and at three other centers in Northumberland and Durham. It is also being regarded with favor, I believe, for the Lanarkshire station at Coatbridge; but this center is not yet completed. It is also worthy of remark that the permanent-brigade system is that adopted at the important station in Liévin, northern France.

The following figures refer to system A, under which the only person housed at the station is the instructor, and they assume that one of the forms of oxygen-regenerator breathing apparatus is to be adopted.

Unless buildings already exist which can easily be adapted, a central station on not too lavish a scale usually costs between $10,000 and $12,500 for buildings and permanent fittings. To this must be added $5,500 for a complete equipment and from $2,500 to $3,500 for a specially built automobile. It is also wise to buy a second car—a light, cheap knockabout at, say, $1,000. Treated considerately, a light car of this kind is economical and handy for running to collieries when the apparatus maintained at the mines has to be changed for freshly charged and overhauled apparatus from the station or when brigades are to be put through their drill at the mine.

The annual running costs of a station, not including those of the automobiles—a variable item—usually amounts to about $22 or $25 per person trained. This figure does not cover the wages and fares of the men.

Owing to the increasing price of materials and labor, the first cost of a station has a continual upward tendency. On the other hand, recent improvements in regenerators are considerably reducing the expenditure for drills. When the liquid-air apparatus is adopted the first cost is increased, but the running cost is still further cut down.

How Collieries Share First and Annual Costs

In Great Britain the whole cost of a rescue station is borne by the colliery owners. There is assistance neither from the government nor from the miners' union.

There are four methods in use by which the costs of a rescue station are shared among the various companies associated with it. These are as follows:

1. Imposing an equal share on each colliery.
2. Dividing charges according to the number of brigades requiring training.
3. Apportioning expense according to the coal output of the collieries, or, what is almost the same, according to the number of underground employees; or
4. A method combining methods 2 and 3.

The first plan, which is employed at two of the smaller coöperative stations, may be dismissed at once. It is manifestly unfair to the smaller concerns.

The number of brigades requiring training under system A is not in proportion to the number of underground employees, for large collieries have proportionately fewer corps than smaller operations. Thus a pit employing 150 men below ground requires one brigade of 5 men, whereas a pit employing 1,500 requires, not ten, but only four brigades. The second method of dividing the costs presses somewhat severely, therefore, on the smaller collieries. They find that with that method their expenditure for rescue work, when expressed per ton of their output, is more than is being paid per ton by a large colliery near by.

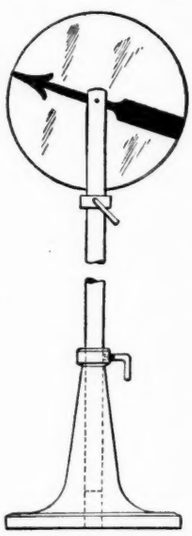
Some of the larger collieries, on the other hand, are up in arms against the third method—which is nevertheless the commonest of all. They claim, with a show of justice, that as their legal obligations are met by proportionately fewer brigades, their costs should be proportionately less. The result is that the smaller companies are passionately devoted to method 3, while the larger companies are just as strongly in favor of method 2.

As it must be admitted that there is something to be said on both sides, a compromise may have to be sought. It is found in method 4, which is that adopted by two stations. Probably the most equitable system on which to divide rescue-station costs is to share the first cost of the station and equipment on the tonnage basis, or, alternatively, according to the number of underground employees; then to divide the annual running cost under two heads—that is, "training charges" and "general charges," the former being distributed according to the number of brigades each company requires and the latter in proportion to the tonnage mined or to the number of underground employees engaged.

Under "training charges" go all items of annual expenditure directly resulting from the training or practicing of brigades, such as the cost of chemicals and oxygen, repairs to apparatus, charging lamps and a fair proportion of lighting and heating costs. The "general charges" include everything not placed under "training charges."

A Holder for Danger Signs

Safety experts attach much importance to the disk-shaped danger signs of different colors now used by many industrial concerns, says J. E. Cooley in the *American Machinist* of Sept. 2. The drawback, however, found in using these signs is that there is not always a suitable place to hang or tack them up at a point where danger exists. The workmen are therefore exposed to hazard because it is too much trouble to provide a means by which the admonition may be displayed.



A CONVENIENT DANGER SIGN

The illustration shows a danger-sign holder that can be moved about for temporary use or fastened to the floor. It is made so that it can be used anywhere and is so constructed that the sign can be set to point directly toward the danger to be avoided.

It consists of a cast-iron base having an adjustable rod about ½ in. diameter, held in place with a binding-screw in the base. The top of the rod is sawn down a short distance through the center so as to provide a place for the sign, which turns in a small pin, as shown. The binding-collar and screw near the top secures the sign in place, after the arrowhead is set to point at the danger to be avoided.

The use of these holders will prevent many accidents. Several of these signposts should be made and placed where they will be accessible at all times.

A Safe Switchboard

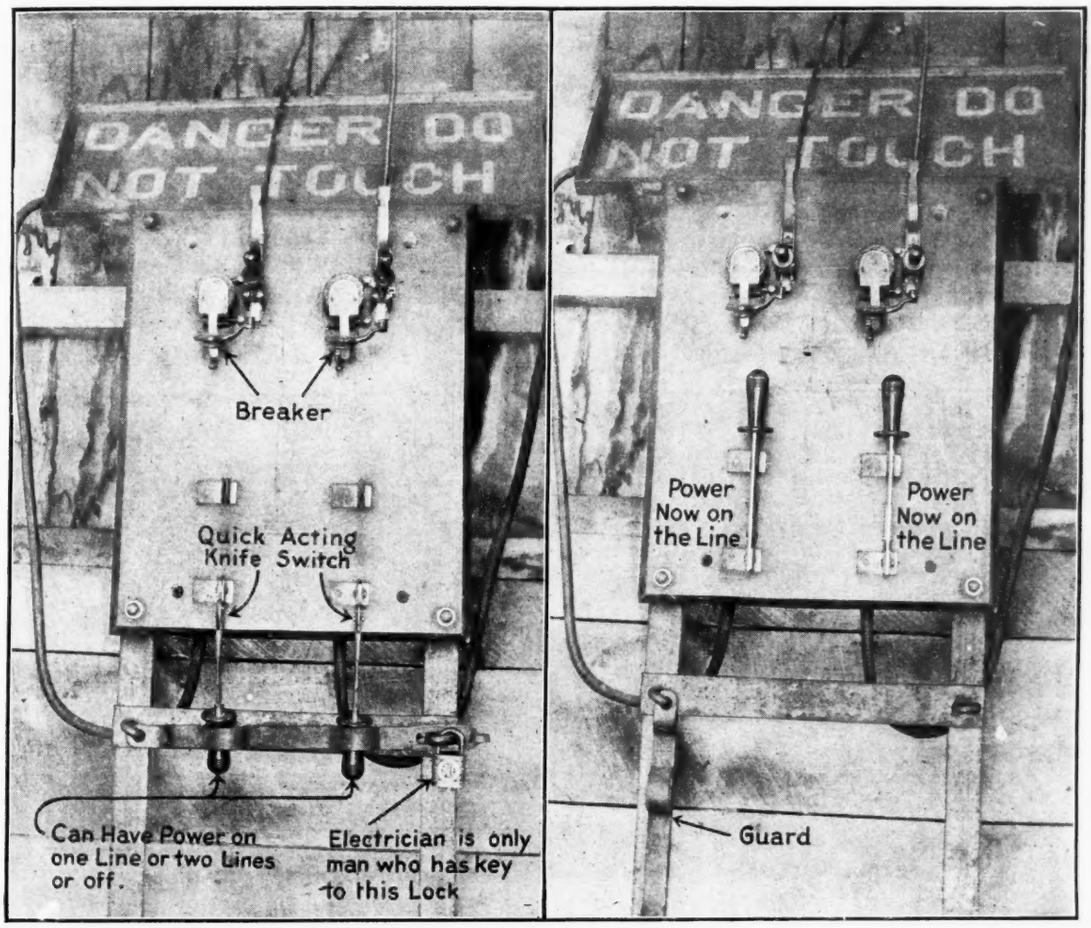
At many mines where electric transmission is employed crude means are provided for switching the current on and off. Not long ago a mine came under my notice where a knife switch attached to a pole exposed to the weather and within reach of a tall man was used for this purpose. When in the morning the men wanted to throw on the power they would do so with the aid of a stick. Frequently the stick employed was wet, with the result that the man who used it would receive a shock.

I changed this method and installed a switchboard in a small building, guarded as shown in the illustrations. Now when there is anything the matter with the lines

the electrician can lock out the switch which controls the defective circuit with a private lock, to which no one but himself has a key. This insures that he will be entirely safe from injury caused by the switch being thrown in either by mistake or through ignorance.

To make these switches safer, a set of lights was installed, which burn whenever the power is on the line, thus illuminating the switch-house, which enables the men to see plainly the live wires coming into the switchboards.

Several experts have examined this installation and said that it was "all to the good," and that they could not see where the design could be improved, considering the work to be done.


DANGER DO NOT TOUCH
Breaker
Quick Acting Knife Switch
Can Have Power on one Line or two Lines or off.
Electrician is only man who has key to this Lock
DANGER DO NOT TOUCH
Power Now on the Line
Power Now on the Line
Guard

TWO VIEWS OF SWITCHBOARD SHOWING SWITCHES LOCKED OUT AND WHEN CARRYING CURRENT

Coal Mining in Montana

Montana mines produced 2,805,173 short tons of coal in 1914, valued at $4,913,191. As compared with 1913 the production of coal in Montana in 1914 showed a decrease, according to the Geological Survey, of 435,800 tons in quantity and $740,348 in value. The major part of this decrease occurred in Carbon and Musselshell Counties, the coal of which is used mainly by railroads, and in the Great Falls field, in Cascade County, which supplies a large quantity of coal to the copper smelters of Anaconda and Great Falls. Other coal fields, however, such as the Lewistown, in Fergus County, which supplies the domestic trade, showed a small increase such as normally follows an increase in population.

There were no serious interruptions to mining operations in 1914 because of labor troubles, and there was no scarcity of labor. A total of only 171 men was reported on strike, for an average of seven days each. The quantity of machine-mined coal increased from 1,076,641 tons, or 33.2 per cent. of the total product, in 1913, to 1,213,051 tons, or 43 per cent. of the total, in 1914. The proportion of coal shot off the solid decreased from 35 per cent. (1,143,364 tons) in 1913 to 32 per cent. (895,279 tons) in 1914.

The number of men employed in the coal mines of the state in 1914 was 3350, and they worked an average of 209 days, as against 3630 men for an average of 228 days in 1913. The mine workers of Montana have a good record for efficiency, the state in 1912 showing the best average production per man per day among all the coal-producing states. In 1914 the average production per man for the year was less than in 1913 (837 tons against 893 tons), but the average daily output by each employee was 4 tons in 1914 as against 3.92 tons in 1913 and 4.03 tons in 1912. The fatality record maintained by the Bureau of Mines shows a decrease from 20 in 1913 to 8 in 1914. Thus the loss of life in the mines for 1913 was one man per 181.5 employed or per 162,048 tons mined. In 1914 the loss was only one man per 418.8 men at work or per 350,647 tons of output.

Mine Rescue Signaling Device

By Oscar Cartlidge*

SYNOPSIS—An electric cable life line for mine-rescue work has been devised by the safety inspector of the Superior Coal Co.

The illustration shows a signaling device for mine-rescue and fire-fighting crews, based on the ideas of James Boston, safety inspector for the Superior Coal Co., Gillespie, Ill. It was worked out and perfected by Herman L. Seekamp, chief electrician for the same company.

Three No. 6 Columbia dry-cell batteries are placed inside the spool of a regular Jeffrey machine-cable reel, to which is connected 1,000 ft. of round, insulated, No. 16, three-wire cable. In the hub is fixed a "buzzer" button, and to the other end of the wire is attached a "buzzer" of the ordinary type, which is inclosed in a moisture-proof brass case of special design. This is provided with a loop through which the belt of the operator is passed. A stout cord of sufficient length and having at one end a stirrup or handhold is attached to the wire about 5 ft. from the end, and by this means the cable can be dragged without putting any stress on the buzzer. Similar handholds are placed at regular intervals for others of the crew.

In the operation of the device the reel is carried to the "station" or base of operations and is left in charge of a "reelman," whose duty it is to see that the wire does not become entangled while being paid out and to take up slack when notified through the life line. He also attends to all instructions received from the rescue team. A printed code of signals is attached to the reel, and a similar code is carried by the inside leader; but as a further precaution he is also required to memorize it.

The following code has been devised for use by teams at work, it being the intention to have as few signals as possible, because they should be memorized by all the inside men.

CODE OF SIGNALS FOR USE WITH LIFE-LINE

From Inside to Outside

One long ring means "All is well."
One short ring means "Take up, or stop taking up life line."
Two short rings mean "In dark; coming out."
Three short rings mean "Trouble; send in assistance."
Four short rings mean "Rescue corps leaving life line."

From Outside to Inside

One long ring means "Want to hear from you."
One short ring means when life line is in motion "Stop," and when life line is stopped means "You may proceed."
Five short rings mean "Assistance coming."

This device is not only useful for signaling purposes but serves as a life line for inside crews when they are compelled to make their way out of the mine in dense smoke. It has an advantage over a telephoning apparatus in that it is not necessary to attempt articulation, which is always difficult when wearing a breathing apparatus in irrespirable air. It is out of the way, compact, and therefore easily transportable. Its entire weight does not exceed 100 lb., and it costs to construct, including 1,000 ft. of wire, not more than $40.

This apparatus has been proved to be satisfactory and practical after long use in the Superior Coal Co.'s mines.

A GROUP OF OFFICIALS WITH THE MINE-RESCUE SIGNALING DEVICE

From left to right, standing—Oscar Cartlidge; Archibald Drew, state mine inspector; John P. Reese, general superintendent of properties of the Northwestern R.R.; Herman L. Seekamp, chief engineer, Superior Coal Co.; and P. H. Shanahan, superintendent, Superior Coal Co. The man kneeling is James Boston, safety inspector of the same company

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Mechanical vs. Manual Methods of Resuscitation

By Dr. James M. Booher*

SYNOPSIS—While manual methods of resuscitation serve a useful purpose, the air they furnish is less than is naturally supplied by vital action when the person is in normal condition. The author states what characteristics he believes an insufflator should possess.

Resuscitation of the apparently dead has been attempted by various means since the beginning of history. The ancient Greek and Egyptian physicians used reeds through which they endeavored to blow air into the lungs. The first really organized effort toward establishing permanent first-aid stations was made at Amsterdam, Holland, in 1767. Shortly after this, in 1774, the Royal Humane Society was organized in London. Its record shows that it used the bellows successfully as a means of resuscitation. For a considerable length of time the methods of this society were regarded as standard and received the approval of the civilized world.

Dr. LeRoy de Etoiles, who experimented on the apparently dead, especially with the bellows, reported to the French Academy that lung tissue could be ruptured by this means. Following this report, the French Academy appointed Dr. M. M. Dumerial and Dr. Magendie as a committee of investigation. The report which these two physicians made to the academy was not read for several years after it was submitted, and, due to a misunderstanding, the medical profession of the entire world was under the impression that this committee had condemned mechanical resuscitation.

What the committee actually did report was that the bellows, which was the device in general use up to that time, was the best means known of preserving the life of those apparently dead from asphyxiation and other causes, and they recommended that more time be devoted to the training of the men who were to use the bellows, and that the instructions given them be so modified that the attendants would not injure the lung tissue.

Following this, Dr. Silvester brought forth his manual method of inducing resuscitation of the apparently dead. This was followed by the introduction of the Schaefer manual method.

Manual Methods Furnish Only Minimum Air

The Schaefer and Silvester manual methods of artificial resuscitation are now in universal use. Many thousands of men have been trained, and rightfully so, in their use. That they are the most available of the manual methods of resuscitation and can be applied immediately is the principal argument in their favor. They were formerly thought to be much more efficient than they really are. The early experimenters, in examining and investigating both methods, failed to take into consideration the fact that the conscious individual will automatically take just the amount of air that he desires. They overlooked the fact that this is an involuntary action and cannot be controlled.

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Later investigators, by performing experiments on a subject in apnœa (a condition where all desire to breathe has been removed) found that the air exchange secured by these manual methods is dangerously near the minimum requirement for the preservation of life.

The maximum amount of air exchange which can be afforded a subject in apnœa, by use of the Silvester or Schaefer manual methods is 300 c.c., whereas a person normally breathes at each respiration from 500 to 600 c.c. This shows that neither method will give a man as much air as he would normally breathe. The only known means of giving an asphyxiated person a sufficient amount of air to maintain life is by forcing this air into the lungs mechanically. The following table, taken from Technical Paper 77, United States Bureau of Mines, shows the exchange of air secured in a normal subject and in one in apnœa. In other words, the table shows the amount of air a man normally breathes and the amount of air exchange that can be secured by the Silvester and Schaefer manual methods.

	Subject Normal	Subject in Apnœa
Silvester method	500-600 c.c.	150-200 c.c.
Schaefer method (arms flexed at sides)	500-600 c.c.	125-200 c.c.
Schaefer method (arms stretched forward)	500-600 c.c.	200-300 c.c.
Natural breathing at the same rate as the artificial	500-600 c.c.	

In order that the amount of air replenishment secured by manual methods, as given in the table may be compared with that obtained by mechanical means it may be stated that the lungmotor will give an air exchange of 750 c.c. per respiration.

What Is Needed to Restore an Asphyxiated Person

When a person is breathing naturally there is an increase in the "negative pressure" in the thoracic cavity. This is known as the suction action of respiration on the heart and great vessels. That the manual methods do not permit or cause the normal fluctuations of pressure in the thoracic cavity also contributes to their inefficiency. It is now a recognized fact that it is necessary to maintain the statics (pressures) in the thoracic cavity if the following ends are to be obtained:

1. Restored circulation, which (a) renews the suction action of the thorax, (b) tends to prevent fibrillation of the heart, and (c) raises coronary blood pressure.
2. Restored respiration, because (a) the blood must be supplied with oxygen; (b) this oxygenated blood must be carried to the respiratory, circulatory and other brain centers; and (c) this oxygen must be in sufficient amount to maintain the cell metabolism of the brain.
3. Normal exchange of air.

It is understood that the above-mentioned results can be obtained only with a mechanical device, and then only during the period previous to that of absolute oxygen want and a few minutes thereafter.

The dangers inherent in both the Silvester and Schaefer manual methods of artificial respiration, though real and not of infrequent occurrence, have probably been magnified. They should in nowise negative the use of either method. In case of accident one of these meth-

ods—preferably the Schaefer—should be followed immediately, but a mechanical respirator should be secured as quickly as possible, because in critical cases, where a real period of oxygen want is being experienced, the mechanical device will do that which neither of the manual methods can accomplish.

The fact must always be kept in mind that a mechanical device, to be successful in resuscitating an unconscious individual, must be applied within a reasonable length of time. In other words, the device must be readily available to the scene of accident. One of the great troubles in connection with mechanical respiration has been that the general public did not realize that in order to be effective the devices must be applied within the first half hour after an accident. This is a maximum time. A larger percentage of lives will be saved by devices applied within the first 15 min. than when their use is delayed for the longer period.

In cases of electric shock and drowning, no more than 15 min. should elapse after the accident before the device is applied, and more lives will be saved where the appliance is used during the first 5 min. This is not impossible of accomplishment, because the devices are small enough to be placed on every electrical repair wagon, in every power house and at all points where an accident may be likely to happen.

As an example, experience has taught that, in cases of drowning, the machines which are located on the beaches, where the accidents are liable to occur, have been extremely successful in resuscitating all those who have been removed from the water within a reasonable length of time after submergence.

In cases of carbon-monoxide poisoning, or gas poisoning of any character, the time limit for the application of mechanical resuscitating devices is much greater than in cases of drowning or electric shock, because a man who has been overcome by gas may remain in a condition of partial oxygen want for a considerable period of time before an absolute deprivation of oxygen from the system occurs. In other words, the success of any device after any given period of delay depends entirely on how much carbon monoxide has been absorbed by the hemoglobin of the blood. In such cases it is desirable that the oxygen be administered under pressure, in order that a greater absorption of oxygen may be secured.

What an Insufflator Should Do

The securing of an efficient mechanical respirating device has been a laudable object of experimental work by physicians for many years, and as a result a number of devices were made which were without doubt more efficient than the manual methods and which have been used most successfully in cases of gas poisoning.

Mechanical resuscitating devices until recently have not been so successful in electric shock and drowning because in these two conditions it is necessary to accomplish many things which the machines failed to do.

In drowning, the devices failed to remove the water from the mouth and trachea and to draw the mucus from the air passages. In electric shock they failed to maintain the statics (normal pressures) of the thoracic cavity, and had practically no tendency to facilitate the heart action by increasing coronary blood pressure.

They were simply devices for putting air into and removing air from the lung, and the fact that they could give sufficient air to maintain life was their only favorable feature. The dangers inherent in them were recognized by many persons, but when life was seriously menaced these dangers were not sufficient to warrant a rescuer in not using such devices.

At the present time there is on the market a device, the lungmotor, which is safe, effective and small enough to be available for general use. This apparatus was under observation and the closest investigation of the United States Bureau of Mines for about 19 months before that body decided to install it in its first-aid cars and stations. This was in April of the present year.

In the light of present knowledge a mechanical respirator, in order to be acceptable to the medical profession and the public at large, should be able to conform to the following standards, and with these the lungmotor adequately complies:

(1) No mechanical respirator should be considered efficient which will not keep alive an animal so completely curarized that it cannot breathe. In any such test when the mechanical respirator is stopped the breathing of the animal should cease. (2) Normal excursions of the diaphragm should be secured with visible inflation of the air sacks, as shown by inspection of the surface of the lung. (3) The device should be able to remove water from the mouth and mucus from the trachea. (4) It should be able to give air at all times and oxygen and air in any percentage desired. (5) It should keep a lung full of air within the normal diameters of the lung itself. (6) There should be no distension of the lung to the extent which would elongate or flatten the lung epithelial cells. (7) The device should be capable of developing sufficient pressure to remove any foreign object which is not too tightly lodged in the trachea. (8) It must supply a sufficiently rapid exchange of air to maintain human life. (9) The air or oxygen should be introduced into the lung under a safe pressure. The maximum pressure within the limits of safety is desirable. (10) There should be no direct suction action upon the air cells. (11) Suction should be developed within the trachea, but not transmitted to the ultimate air vesicles. (12) The device should maintain the normal pressure within the thoracic cavity, but not within the lung, where a positive pressure is desirable. (13) The device should in no case create a vacuum in the lung or passages. (14) The lung should be kept as nearly as possible in the position in which it was during life. (15) An even rise and fall of the chest wall should not be considered necessary, but it is desirable. (16) The device must be safe, efficient, available and always ready; that is, it should not be so constructed as to get out of order easily.

There is no claim made by the various manufacturers of resuscitating devices that their apparatus will revive the dead; but the claim that a person may be apparently dead and may be revived is borne out by experiments performed in the physiological laboratories, as well as by the experience of men who have used resuscitating devices in many accident cases.

As an example of this: A dog may be apparently killed by ether anæsthesia. He may cease to breathe and his heart may stop beating, and a mechanical resuscitating device will bring him back to life. That this has been done by an eminent physiologist in the United States 30 min. after all respiration and heart beat have ceased shows how tenacious of life animals are.

Cost of Upkeep of Electric Cap Lamps

SYNOPSIS—The material used in the maintenance and repair of lamps at the Crow's Nest mines of the Keystone Coal and Coke Co., excluding all damage caused by miners, has cost not quite 1c. per lamp shift for the six months since the lights were installed.

The Keystone Coal and Coke Co. has its leading mine at Crow's Nest, near Greensburg, Penn. This mine is one of the best and most efficient in the State of Pennsylvania. One of its uptodate features is the installation of electric cap lamps, of which 250 are in use. Illustrations of the lamp and battery racks are shown in this article, and tables will be found setting forth the cost of maintenance and that of mechanical injuries sustained by the lamps when in the charge of the miners.

In the six months covered by the report the lamps were burned for 34,419 lamp shifts. The list cost of the spare parts totals $521.83. A discount of 20 per cent. may be figured on these prices, leaving the net cost of parts and acid consumed $417.45.

But of this some material was broken while in the care of the miners:

6 lamp bodies, at 70c.	$4.20
20 lenses, at 20c.	4.00
218 bulbs, at 45c.	98.10
3 safety devices, at 25c.	.75
2 lamp holders, at 15c.	.30
	$107.35
Less 20 per cent. discount	21.47
Net cost of material	$85.88

This leaves $331.57 of the cost chargeable against the lamp-station expense, and dividing the sum thus obtained by the number of lamp shifts, 34,419, the cost of material obtained is $0.00963, or less than 1c. per lamp shift.

These figures are obtained from daily reports, which are made out in duplicate by the man in charge of the lamp station. One copy is delivered to the mine foreman and the other to the company supplying the lamps, the Mannesmann Light Co. of America. The reports from the lamp foreman are on file and can be inspected by anyone.

It will be noted that the figures given include not merely what are known as spare parts and repairs, but sulphuric acid and celluloid paste also. Thus all possible material charges are included, though of course it will be observed that the cost of current, amortization, interest and labor of lampman are not figured.

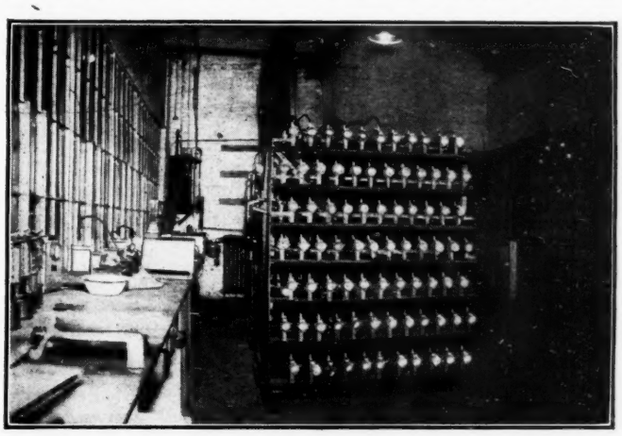
Bulbs and Cables Are Chief Repair Items

It is noticeable that the cost of electric bulbs and cable are the two principal items in the list. Schedule 6A of the United States Bureau of Mines requires that the average life of lamp bulbs shall be not less than 300 hr. for primary and acid storage batteries and not less than 200 hr. for storage batteries using an alkaline solution. Not more than 5 per cent. of the bulbs examined shall give less than 250 hr. life with acid batteries, nor less than 170 hr. life with batteries having an alkaline electrolyte.

If the number of working days in the month is taken at 25 and the number of shift hours at 12, there would be 300 hr. during which the lamps would be in use in any month. Under such circumstances a bulb of 300-hr. capacity would have to be renewed every month, or 12 times in a year. If the price of each bulb is 36c., the cost per annum would be $4.32 per lamp per year. This maintenance would be far too heavy, as it covers the cost of bulbs only.

Over 600 Hr. of Burning per Bulb

At Crow's Nest the total number of approved bulbs received up to Sept. 18, 1915, was 995. Some of these of course were mounted in new lamps and others were placed in stock. On Sept. 18 there were 157 bulbs in reserve. Thus there were 838 bulbs broken, consumed or in use. The miners had broken 218 bulbs in service. It seems conservative to rate half of these as burned-out bulbs.



LAMP RACKS AND TENDING TABLES AT CROW'S NEST

The bulbs were destroyed by the mishandling of the miners, but not being new they would not have burned as long as bulbs from stock, even if they had not been injured. The loss from negligence can therefore be calculated as being equivalent to 109 bulbs.

This can be deducted from the loss as previously obtained, leaving 729 bulbs destroyed by burning out. The same assumption, that the bulbs when unbroken have still half their life unexpired, may be applied to the bulbs in the lamps. There are 250 of these. It will be assumed that their life is equivalent to that of 125 bulbs fresh from stock. These bulbs can be deducted from the number already obtained and the bulbs actually consumed will be 604.

The number of lamp shifts of these 604 bulbs is 34,419. Each shift is taken at 11 hr., giving 378,609 lamp hours, or 627 burning hours per bulb, or 57 shifts of 11 hr., instead of the minimum average as required by the bureau for an acid battery, namely, 300 hr.

Assuming the number of shifts in a year to be 300, then 5.26 bulbs will be needed per year, which at 36c. would entail an expenditure of $1.89. Where the Mannesmann Light Co. maintains its lamps at so much per shift it stipulates that the operating corporation shall charge its

miners with the net amount of all material destroyed through the carelessness of these employees. It is fully justified in assuming therefore that the estimates of lamps broken by miners is not in any way excessive.

Cable Breakages May Be Further Reduced

The cable used is marked as 5 ft. long. As a matter of fact it need only be 4½ ft. The additional 6 in. is added for conservative estimation. The cable is the one part of the lamp still furnishing a small problem to the manufacturers, and efforts are being made to solve it in a more satisfactory degree.

This is indeed the weak point in electric cap lamps; but the lamp firm to which we have referred has introduced at Crow's Nest a cable attachment which seems to remove

MATERIAL DESTROYED BY MINERS AT CROW'S NEST MINE FROM MAR. 22 TO SEPT. 18, 1915

Period	Lamp Bodies	Lenses	Bulbs	Safety Devices	Lamp Holders
Mar. 22 to Apr. 30	1	5	50	1	1
During May	3	4	52	1	..
During June	..	3	45	..	..
During July	..	1	34	..	..
During August	1	6	23	1	..
Sept. 1 to Sept. 18	1	1	14	..	1
	6	20	218	3	2

this trouble, and about 50 per cent. less breakage has been experienced with the new cable equipment than with that on which the figures quoted are based. As soon as the practical tests now under way have been conducted for a sufficiently long period of time more information will be published.

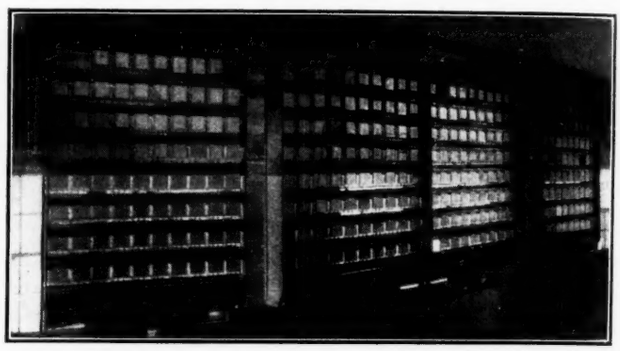
According to observations made, a lamp cable is bent on the miner's back about 7,000 times during the length of a single shift. It is easy to understand therefore to what a severe service it is subjected. It is not so much the kind and quality of the cable which is in question. The important matter is the manner in which the cable is attached to the lamp and battery casing. The tests mentioned are being made from this point of view.

Lamp-Tending Charge Less Than 2c.

It is necessary to consider not only cost of material but the labor and amortization charges. The experience of the Mannesmann Light Co. has been that one man can handle at least 150 electric safety cap lamps and give perfect satisfaction. Thus 300 lamps could be tended by one lamp master and his assistant. If these men are paid $3 and $2 a day respectively, and 25 days are figured to a month, the monthly payroll will be $125. If they work to capacity—that is, charge and clean 300 lamps for each of the 25 shifts—each lamp-shift labor charge will be 1.66c., or about 1¾c.

All Costs but Those for Current Total Less Than 5c. a Lamp Shift

In figuring the battery maintenance charges no consideration has been given to battery renewals, because in the six months during which the lamps have been installed at the Crow's Nest mine the batteries have not needed any repairs. But the time will come when they will, so it is well to be safe and to double the repair bill arbitrarily,



BATTERIES RECEIVING RENEWING CHARGE

making that item 2c. Adding the labor charge to this, the cost of operating is 3.7c. per lamp shift.

The custom in most American coal mines is to charge the miner at least 5c. for the use of a safety lamp during one shift. Taking 5c. as the charge, the balance left for the operator would be 1.3c., and this would have to cover amortization and interest on invested capital. A small lamp plant of 300 lamps running 250 shifts per year would give a total of 90,000 lamp shifts, which at 1.3c would provide $975 for amortization and interest.

Such a plant for the Manlite lamps, including the lights themselves, would cost about $2,750. An amortization charge of 30 per cent. and 6 per cent. interest would amount to $962.50. So it will readily be seen that the electric cap lamp not only gives a good light and assures safety from gas and other causes, but also is at 5c. per lamp shift by no means an unsatisfactory investment. To the advantages of cap lamps already mentioned may be added those of cleanliness, lightness and general availability.

MATERIAL USED IN MAINTAINING AN INSTALLATION OF 250 LAMPS AT CROW'S NEST MINE OF THE KEYSTONE COAL AND COKE CO., GREENSBURG, PENN., FROM MAR. 22 TO SEPT. 18, 1915

	Spare Parts Used	Mar. 22 to Apr. 30 Pieces	List Price	Total	During May— Pieces	List Price	Total	During June— Pieces	List Price	Total	During July— Pieces	List Price	Total	During Aug.— Pieces	List Price	Total	Sept. 1 to Sept. 18 Pieces	List Price	Total	
1	Lamp bodies	3	$0.70	$2.10	5	$0.70	$3.50	2	$0.70	$1.40	..	..	..	7	$0.70	$4.90	2	$0.70	$1.40	1
2	Lenses	8	.20	1.60	3	.20	.60	1	.20	.20	2	$0.20	$0.40	8	.20	1.60	2	.20	.40	2
3	Rubber rings for lenses	1	.10	.10	1	.10	.10	..	..	..	..	..	..	105	.10	10.50	..	..	..	3
4	Bulbs	97	.45	43.65	105	.45	47.25	99	.45	44.55	83	.45	37.35	45	.45	20.25	16	.45	7.20	4
5	Bulb springs	1	.05	.05	1	.05	.05	..	..	..	..	..	..	..	..	..	..	..	..	5
6	Safety devices	6	.25	1.50	5	.25	1.25	..	..	..	..	..	..	..	..	..	1	.25	.25	6
7	Connection pieces	5	.20	1.00	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7
8	Rubber washers	..	..	..	1	.02	.02	..	..	..	..	..	..	..	..	..	..	..	..	8
9	Lamp holders	1	.15	.15	2	.15	.30	..	..	..	..	..	..	5	.15	.75	3	.15	.45	9
10	5 ft. cable lengths	7	.25	1.75	221	.25	55.25	233	.25	58.25	309	.25	77.25	169	.25	42.25	84	.25	21.00	10
11	Leather sleeves	..	..	..	..	..	..	4	.35	1.40	..	..	..	..	..	..	..	..	..	11
12	Aluminum shields	2	.10	.20	2	.10	.20	..	..	..	4	.10	.40	..	..	..	..	..	..	12
13	Casings with belt hook	..	..	..	..	..	..	..	..	..	..	..	..	15	.51½	7.75	..	..	..	13
14	Hooks for locks	..	..	..	..	..	..	..	..	..	2	.25	.50	3	.25	.75	..	..	..	14
15	Rubber corks with pipe	3	.07	.21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15
16	Rubber corks without pipe	4	.05	.20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16
17	Celluloid covers of casings	..	..	..	..	..	..	..	..	..	3	.30	.90	..	..	..	..	..	..	17
18	Celluloid covers for gas chamber	..	..	..	..	..	..	1	.05	.05	..	..	..	..	..	..	..	..	..	18
19	Celluloid vessels	..	..	..	..	..	..	..	..	..	4	1.05	4.20	..	..	..	..	..	..	19
20	Pints of celluloid paste	..	..	..	..	..	..	..	..	..	1	1.75	1.75	..	..	..	1	1.75	1.75	20
21	Carboys of acid	1	2.20	2.20	..	..	..	1	2.20	2.20	1	2.20	2.20	1	2.20	2.20	1	2.20	2.20	21
	Total			$54.71			$108.52			$108.05			$124.95			$90.95			$34.65	
	Delivered lamp shifts			6,434			5,813			6,561			6,047			5,905			3,659	

Self-Acting Ventilation Door

By J. F. K. Brown*

SYNOPSIS—A type of door is here described which is opened by the car in the opposite direction to that in which the car is moving. It closes under the influence of gravity and the air current.

Conditions sometimes arise in connection with the problems of ventilation in collieries where the use of a self-acting ventilation door would be of material service. The following description may therefore prove helpful.

Doors of this type are in daily operation in the Hamilton Palace colliery of the Bent Colliery Co., situated in the Lanarkshire coalfield of Scotland. The ventilation of the Nos. 1 and 2 mines is rather peculiarly arranged, in that while the No. 1 mine is the return air mine, No. 1 shaft is the downcast, the reverse being the case with No. 2. This makes it necessary to have every road leading from the bottoms of Nos. 1 and 2 "doored" off, since otherwise the air would short-circuit from the one shaft to the other without getting near the workings. Furthermore, the doors have to be so constructed as to perform their duty thoroughly, as the two shafts are situated at one end of the leasehold and the workings extend for 2 mi. from the shaft, with no other air outlet. The course of the air in the mines is down No. 1 shaft and through special air courses to the main roads leading from the bottom of No. 2 shaft (the doors preventing the return of the air direct to No. 2), thence through the workings of the No. 2 mine, up to the No. 1 seam above, through No. 1 workings and back along the main roads almost to No. 1 bottom, there being again diverted by doors and directed to the No. 2 shaft and the fan.

This arrangement creates a pressure inward in the No. 2 shaft bottom and outward in the No. 1 shaft bottom. As coal travels in and empty cars out from each shaft,

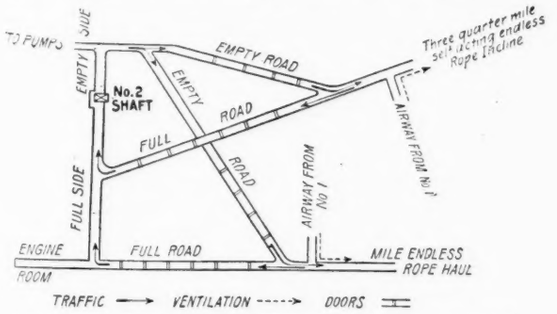


FIG. 1. ARRANGEMENT OF NO. 2 BOTTOM

it follows that some of the doors have to be opened by cars traveling in the same direction as the pressure exerted on the door. In other words, the doors have to be opened against the air pressure before the cars can pass through them.

Type of Haulage Is Important

Another factor which had a bearing on the question of the doors was the haulage system. In each case this was of the endless-rope type, and thus a slow-moving but steady stream of cars passed through the doors coming at fixed intervals. The cars are spaced at 40-ft. intervals on the rope and the doors at a distance apart either greater or less than 40 ft., depending on the condition of the roof. Such an arrangement of spacing provides against the possibility of all the doors in any one road being opened at one time and so short-circuiting the air.

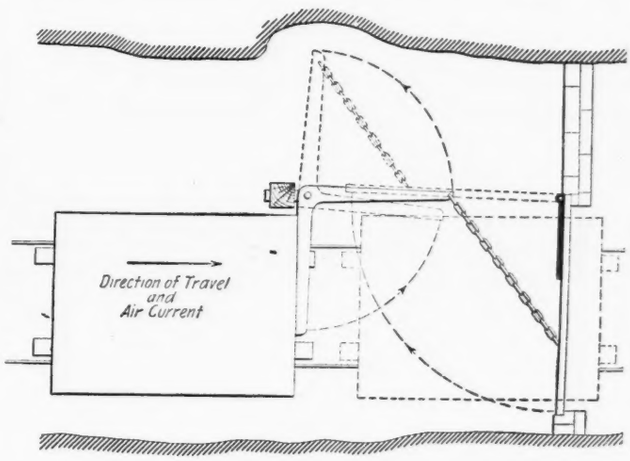


FIG. 2. ARRANGEMENT OF DOOR AND DOOR-OPENING DEVICE

Fig. 1 shows the layout of the No. 2 bottom, the position of the doors, direction of the traffic and the direction of the air current. One of the haulages feeding the No. 2 shaft is a ¾-mi. self-acting endless rope, the other being a power-driven endless rope. The two combined pass daily through the doors on both roads a total of approximately 900 tons of coal—1,400 cars. About the same tonnage goes to the No. 1 bottom.

The actual arrangement of each door is clearly seen in Fig. 2. It consists simply of an ordinary swing-door, to which is attached a home-made device by means of which the door is opened by the advancing car before passing through. The door is opened by a flat-iron bell-crank, to one end of which a short piece of chain is attached, which is connected to the door at a point about three-quarters the width of the door from the swing or hinge side. The other arm of the bell-crank is free and acts as the operating lever. An upright post placed just clear of the passing cars has a pin fixed in it, to which the bell-crank is hung at such a height from the floor as to catch the cars fairly in the middle. When the door is shut, the chain attaching the lever to the door is drawn almost tight, which causes the other arm to assume a position roughly at right angles across the track. On the approaching car coming in contact with the lever it first tightens the chain and then, as the pressure due to the haul rope increases, the door is "jerked" open and swung clear of the track. The relative position of doors, lever, post and cars is so arranged that, in opening, the door swings into the space formed by the two arms of the bell-crank, and thus the operating arm coming between the car and the door serves as a guide, holding the door back while the cars pass through. Both the

*Mining engineer, 247 Esplanade, Sydney, N. S.

post to which the lever is attached and the door posts are set at such an angle from the perpendicular—leaning toward the track—that just as soon as the car passes, the operating lever begins to swing toward the center of the roadway, bringing the door with it, aided by the "set" of the door itself. Then the air pressure catches the door and shuts it tight.

These Doors Are Easily Installed

A door of this design has the advantage of being exceedingly plain and is simple in construction and easily repaired. It can be successfully operated on any mechanical haulage road where the rate of travel is low, but is useless on high-speed "trip" systems. With the constant banging to and fro it may be thought that these doors would quickly get out of order; but if strongly built in the first place and properly cared for by the trackmen they will give long service, even though the installation is a heavy-traffic proposition.

When such doors are erected on a road used as a traveling way as well as a haulage road, caution must be observed when passing through them. When going with the traffic, never pass immediately in front of a car, but always behind it; while if going against the traffic, always wait at each door till a car passes, then slip inside before it closes, and watch the lever inside as it comes back. The "kick" of the lever, coming just about at the height of the knee, and the sudden alarming swing of the door itself have been responsible for careless men sustaining broken legs and broken heads.

This fact shows that this type of door does not open slowly and gently. On the contrary, the process is extremely rapid and abrupt. At the moment of touching the lever, the car, running easily on the rope, seems actually to stop, but as the rope travels on, the pressure exerted by the car on the lever rises rapidly, until the door is flung against the lever, which draws it open.

Extracts from a Superintendent's Diary

Occasionally I take a day or two off and travel forth to see what my neighbors are doing, and how they are doing it.

When I was young at the superintendent's game I felt that every minute of my time belonged to my company and nothing could induce me to leave my work; as a result I soon got into a rut. Fortunately for all concerned, our manager took me in hand before it was too late and gave me a broader vision.

Such trips not only keep me out of the ruts, but do as much for the men under me. I find that if I am on the job constantly, certain subordinates depend too much upon my suggestions in making decisions and in time lose their initiative. Naturally, then, if I get into a rut they follow. If they are left to themselves now and then, however, the effect is almost magical. When I return I find that they have taken things into their own hands, which is exactly what they are paid to do, and the company gets the benefit of their experience, which it very much needs.

The receptions which I receive at the various camps differ considerably, and this uncertainty adds to the pleasure of each adventure. Some superintendents are willing and anxious to compare methods, cost sheets or any other phase of their activities, while others seem to think that their directors desire the strictest secrecy, and when one attempts to draw them into conversation they become as uncomfortable as if they were sitting on pins and needles.

Today I paid a visit to a camp presided over by a superintendent of the taciturn variety, and just because I happened to be in the right mood I kept him squirming most of the time.

During the past two years the coal-mining companies of this state have been trying to get together on some plan that would insure a more permanent and equitable system of taxation. A few companies (the company that owns the mine that I visited today being of the number) have refused to take part in the conferences because they have been able, by playing politics, to keep their assessment on a very low basis. Naturally they are afraid that a tax agitation might make matters worse for them instead of better.

I tried to draw that superintendent into a discussion upon the values of mineral lands in our state, but he dodged the questions that I put to him persistently and completely, and finally refused point-blank to be drawn into conversation at all. While he was dodging the questions I raised about values, etc., he kept trying to switch the conversation into other channels, and unconsciously he let slip a good deal of information that I was anxious to secure, which under other circumstances I would not have obtained.

Although men of his type are not common in the coal business, still I meet a great many mining superintendents who are so thoroughly selfish that they do not feel called upon to give to others the benefit of their experiences. If they tackle something new with disastrous results they keep the fact from their neighbors and leave them to find out for themselves.

Such men do not realize that in turning their backs upon their neighbors they also close their eyes to progress, and in time they must find themselves rolling along in a wide, deep rut that turns neither to the right nor to the left until it ends at a stone wall.

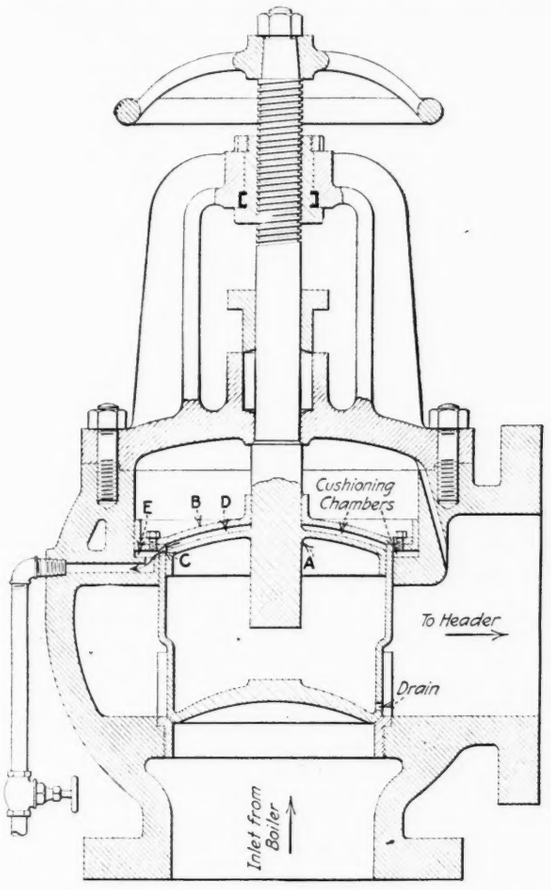
Improved Automatic Nonreturn Stop and Check Valve

The Golden-Anderson Valve Specialty Co., of Pittsburgh, Penn., has just placed on the market what is called its type B automatic cushion nonreturn valve, a cross-section of one variety of which is here shown.

It is well appreciated by steam-plant designers and operators that a stop or check valve should be placed in the discharge line from each boiler to the main steam header. This is to prevent backflow from the header to the boiler if the pressure in the boiler falls below that in the steam line. Such a valve is also useful when a boiler that has been out of service is being fired up and placed in operation, or when a pipe breaks, a tube bursts or a rupture of some other variety takes place in a boiler. In such an emergency a nonreturn valve in the steam line protects the entire plant, since the valve closes and will not permit the contents of the other boilers to escape through the rupture.

Furthermore, this type of valve placed immediately on the boiler nozzle or outlet will not permit the turning of steam into a cold boiler, and consequently acts as an additional protection for men working in it.

A double corliss dashpot method of cushioning is employed in this valve. This prevents hammering or pounding of the disk or plunger on its seat. There is only one moving part to the valve, the piston *B*, which is always in perfect alignment with the seat, regardless of the piston's position. When the steam pressure raises the valve *B*,



THE NEW VALVE SHOWING THE INTERNAL ARRANGEMENT AND THE SMALL VALVE FOR TESTING

the spaces *D* and *E* are instantly filled with steam, as well as the area about piston *B*, so that the valve is perfectly cushioned in opening and closing.

These valves may be tested at any time desired without interfering with the operation of the plant. To prove that they are operative and would respond instantly in case of accident, the small valve in the steam line shown in the drawing may be opened. This valve, which may be placed at any convenient point, connects with chambers *E* and *D* and acts as a pilot valve, the opening of which closes the automatic valve. Closing the small hand valve reopens the nonreturn valve. This feature enables the attendant to determine at once whether the valve is in working order. It is not necessary for him to climb on top of the boiler to close or open the nonreturn valve by means of a handwheel.

These valves are of heavy construction and are correctly designed and properly finished. They are guaranteed not to chatter, hammer or stick, and to be positive, durable and economic. They are made in three general types—elbow, angle and globe—of cast iron, semisteel or cast-steel body and bonnet, with bronze, nickel bronze or monel-metal contact faces.

Pages from a Miner's Notebook: Toll of Goodfellowship

A young fellow was fired today. He came here several months ago, a promising sort of boy—he is scarcely twenty-four—and got a job helping on a machine. He was energetic and willing and for the first few weeks performed his work capably and to the satisfaction of the mine foreman. But he got in with the wrong crowd.

There is a bunch of young fellows here—machine runners and helpers and motormen, single men staying at the hotel—who find in the conviviality of the saloon their recreation. Some of them can afford to spend their money freely, and some of them have constitutions that can stand the work in spite of the drink-destroyed tissues of the body. This boy could do neither.

His work suffered. His place on the machine was taken by another man, a Slav, much to the disgust of the runner, who claimed he had rather have a "good fellow" for a helper than a "surly dago." But despite his objection he must realize that he is cutting more coal since the change. The boy was given a chance on the motor and for a time it looked like he would make good. But his first pay started him again on the "goodfellowship route," and in another 10 days he was taken off the motor and put to cleaning track. He was then a common laborer in an unresponsible position.

During the day, when all was activity about him, he stood up to his work, but a breakdown forced a number of men to the night shift, he among them. The first few nights passed all right; but his was not one of those constitutions which can stand a night's work after a day's carouse with other good fellows in the saloon, and in a few nights his work dropped off.

Last night he was found by the pitboss asleep. Nature will not stand abuse from even the princes of goodfellowship. The tired nerves and muscles demanded a rest and took one.

He was given his time, and to put the crown on his reign of good fellowship it was found that his time check was not sufficient to meet his board bill. He explained his predicament to his friends in the saloon, but they only laughed. The manager of the saloon offered him enough to pay his fare to another camp.

He was a good fellow. He was also a man. He learned in that hour the price of goodfellowship, and like a man he went to his boarding house, explained the situation to the motherly old lady with whom he boarded, offering to send her the money due her as soon as he obtained employment—almost cried when she told him that would do—and a few moments ago disappeared over the hill with his little bundle of pit clothes on a stick over his shoulder—walking, walking with eyes straight ahead toward the nearest camp 12 mi. away.

As I passed the office I heard the superintendent at the telephone asking the superintendent of that nearest camp to give the boy a job if there was any possible chance. "I believe he'll keep off the primrose path from now on if he is given a chance," said the superintendent just before he hung up the receiver.

Dangerous Wiring in Mines

By H. J. Johnson*

I have read excellent articles at different times on safe methods of mining, but I have not seen much about mine wiring. Under certain conditions, which I shall try to explain, electricity is dangerous in mines, especially where gas is encountered in considerable quantities.

To make my position clear, I will start at the bottom. First, what is electricity? Any textbook on this subject will say in effect: "We do not know what electricity is; we only know the effects due to it and the laws which it follows." The law of water flowing through a pipe is analogous to that of a current of electricity flowing along a wire.

Take for illustration a tank filled with water, located on the top of a mountain, with pipes leading from it to dwelling houses in the valley. If we set a bucket under a spigot in one of these houses and turn the spigot on, the water flows with considerable force and soon fills the bucket. Now, suppose we place an obstruction in the pipe between the tank and houses, and then turn the spigot as we did before. The water will flow slowly and the bucket will be long in filling, due to the resistance offered to the flow of the water in the pipe.

Now, consider the flow of an electric current along long lines of trolley and machine wire in mines. It takes pressure or voltage to force the current along these wires. Ohm's law states that it takes 1 volt to force a current of 1 amp. through a resistance of 1 ohm.

Let us see how a great number of mines are wired today. We connect a feeder cable to a circuit-breaker in the power plant and set this breaker to carry the entire load of the mine, consisting of haulage motors, coal-mining machines, pumps, etc. We then connect this feeder to the trolley wire at the mine entrance and run this trolley wire for a mile or more underground, connecting to it machine wires, pump wires, etc. Some of these conductors are small and have a high resistance. Furthermore, track-bonding is none too good in mines.

Suppose one of these machine wires should fall and cause a short-circuit. The resistance of the wires, combined with bad track bonding, would cause the voltage to drop so low that it would not allow enough current to flow back and trip the circuit-breaker at the power plant. I have seen coal-machine cables short-circuited and catch fire, and the machine helper compelled to run down to the heading and pull his cable off the heading wire. Had this room contained dangerous gas there would probably have occurred an explosion.

I have seen a cable burn completely while coiled on its reel. The current was cut off at the power plant, due to a breakdown, and the runner, learning that it would be off for several hours, went home, leaving his cable connected to the heading wire. When the current was turned on again, this cable short-circuited from some cause and burned together with the wooden frame of the reel.

This mishap was the result of having a high resistance line and bad bonding on the return rail. The voltage was reduced so low that it could not force enough current back to the power plant to trip the circuit-breaker. If there had been gas in the mine it might have been blown up and no one would have known the cause.

The remedy for such conditions is to have a magnetic, low-voltage switch installed on each machine and pump line, so as to protect that particular circuit. The use of open faceplate starting boxes for pumps and mining machines, as well as the employment of open motors in gaseous mines, should be avoided, since a spark from either may cause an explosion.

While we may not have an explosion from these causes, the unusual happens sometimes and proves disastrous. An example of such an occurrence was the New York subway accident of a few months ago, in which as the result of the short-circuiting of a cable about two hundred persons were injured.

*Gary, W. Va.

Car-Operated Mine Door

By M. M. Haley*

This door is composed of two distinct parts or shutters which stand with ends exactly opposite each other when in a closed position. When opened by either train or

*Sturgis, Ky.

Ballads of a Coal Miner--VII

Written Expressly for Coal Age

The Explosion

By Berton Braley

FORTY dead—an' mebbe more,
Though the special rescue corps
Fought in fumes that burn an' choke—
Fought in gases an' in smoke,
Fought with all their strength an' breath
In a losin' fight with Death.

Forty dead: Good men an' true
On the job they had to do,
Killed 'way down there in the murk
As they done their daily work.

They was soldiers, sent to fight
Nature, an' to bring to light
Coal that moves the world along—
Soldiers brave an' soldiers strong,
Soldiers that to death was hurled
In the service of the world.

It was fate that they should die? Well, I sort of wonder why.
You kin talk to me all day, but when you git through I'll say,
"Forty dead: Good, sturdy men," an'—I'll ask you "Why?" again.

man the shutters take on a parallel position extending in the same direction as that in which the force is applied. The door is in the entry through which the electric locomotives travel to and from the parting. Regarding the speed of the train when passing through I believe 5 mi. per hour would be safe.

When a car bumper or locomotive strikes the buffer block *b* near the bottom of the door, the shutters open, at the same time pulling on the closing cords *c* on one side and slacking off on the other side.

The 16-lb. steel rails *r* are spiked in the middle on their sides to the joint post *j*, while a small turnbuckle connects either end (Fig. 2) to the bell-cranks *a*, from the other arms of which the cords *c* extend to the shutters. The ends of the spring rails rest on the stop blocks *l*; this insures a constant and steady tension on the shutters.

The armor plate *m* is placed at the proper elevation to strike the bolts and irons on the car bed and thus protect the door.

Fig. 3 shows how the space for the trolley wire is taken care of at *x*; while in this figure *c* indicates I-bolts for the pull rope connections. The bell-crank post *v* and the hinge post *j* are spaced and tied at the top by the stringers *k*. Brattice boards *w* (Fig. 3) may be placed on 2x4 in. studding on the outside and be made flush with the hinge post *j*. The shutters are made of 1 in. boards nailed at right angles, while the hinges *z* are made of ⅜x2½-in. iron and 7x¾-in. I-bolts with ¾-in. pins.

All openings around the door can be closed with tarred brattice cloth, with its edges nailed at dotted lines *e*, (Fig. 3). The arc *n* (Fig. 2) shows the position of the spring rail *r* when the shutters are opened full width, while the dotted lines *o* indicate the edges of the shutters when in this position.

This door is cheaply constructed and can be put together by any mechanic who can drive a nail. The necessary material also can be easily secured around any coal mine.

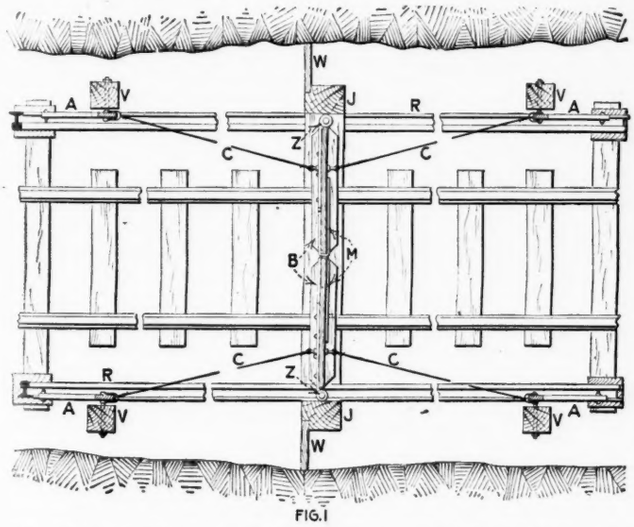


FIG. 1

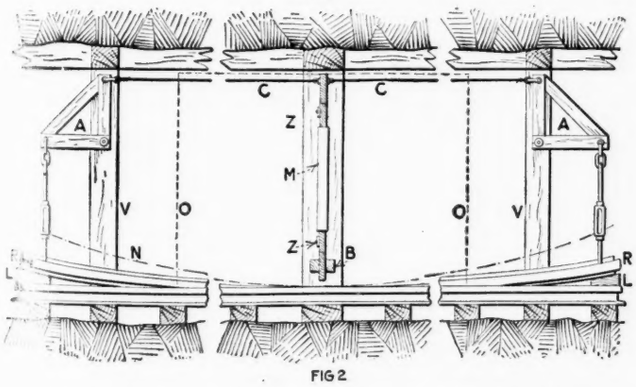


FIG 2

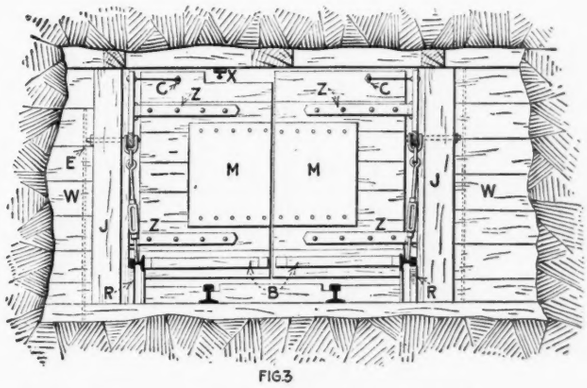
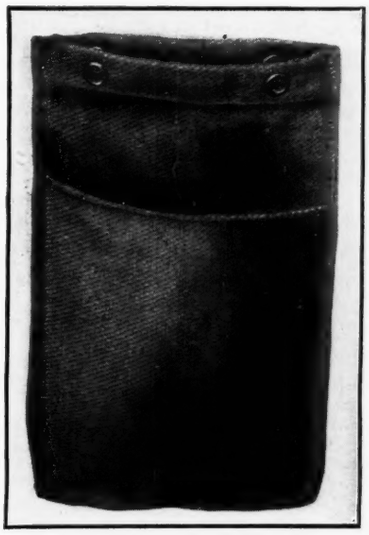


FIG 3

FIGS. 1, 2 AND 3. SHOWING ARRANGEMENT OF DOORS, CABLES, POSTS, SPRING-RAILS, ETC.

Bags for Dynamite and Fuse

Wallace McKeehan, safety inspector of the Copper Queen Consolidated Mining Co. and a leading member of the American Mine Safety Association, with the approval of the central safety committee of the company, recently designed the bag here illustrated for the carrying of powder and fuse. The sack is made of heavy jute and is sewn with flax thread, so that it is exceptionally durable. From 50 to 70 sticks of dynamite can be carried in the bag proper, the fuse being placed in the outside pocket. Large brass eyelets are fastened into the top of the sack for convenience in handling and carrying. It was noted by the management of the Copper Queen mines that all dynamite when handled in quantities of less than a box was carried in any way which would suit the convenience of the miner, it generally being tied together with a piece of fuse. Capped fuse was carried in the miner's hand or wrapped around his hat or thrust loosely in his shirt front. All these methods were exceedingly dangerous, and since the bag has been introduced these bad practices have ceased. The sack is made by the Bemis Bros. Bag Co., St. Louis, Mo., and sells for 35c. in 100-bag lots. The size of the bags is 15x22 in. outside measurement.



BAG FOR EXPLOSIVES

The Labor Situation

SYNOPSIS—Anthracite operators fear that they cannot transfer any large rise in wages and charges from producer to consumer because of competition of bituminous coal and coke. In the Hocking Valley district the miners are beginning to realize that their agreement of July 3, 1914, will have to be obeyed. John D. Rockefeller, Jr., visits his miners and has a good time, but lady politicians and the organization are yet likely to spoil his trip. He declares for the open shop.

The anthracite operators do not feel that they are masters of the situation and doubt very much whether they will be able to make the necessary increased charges to the consumer if they should accede in full or in any large degree to the demands of the miners. It is certain that of late years bituminous coal has been proving an important rival in the market, because the power houses have learned how to use it without making sufficient smoke to draw down official reprobation. In fact it has generally been noted that New York City air has not the clarity it once had because of the extensive change from hard to soft coal.

Of What Value is a Hard-Coal Operator's Fiat?

One of the anthracite operating heads has been interviewed by the Wilkes-Barre "Times Leader," and while he is apparently willing to concede that an increase of wage is indicated by the increased cost of living he is strongly against such wage advances as the miners demand. He declares that the price of anthracite is not determinable, as some think, by the fiat of the seller, because byproduct coke has weakened the market. He says:

"Coke has become the great competitor of anthracite. By the Solvay process it is not only possible to market coke, but the ovenmen can break it down, crush it and then press it into prepared sizes similar to those in which anthracite is delivered to the market.

For example, in the city of Rochester alone the sale of hard coal has declined 30 per cent. in the last three years. In Chicago, Cincinnati, and other cities, formerly heavy users of anthracite, that fuel is being rapidly displaced by coke. In those commercial centers bituminous coal is used for gas, and the coke, which is one of the byproducts, is marketed for a low price. Our company has lost sales in New York State amounting to thousands of dollars because coke has been substituted.

"In Syracuse or Rochester the cost of anthracite is about $6.75. These coke people have gone to users of our product offering coke for $5.50 a ton. They also guarantee that it will show as great or greater efficiency as fuel, far less ash than anthracite and no smoke. They establish a personal service, much as the automobile manufacturers have done. When a man buys their coke they give him a booklet of instructions telling him how to burn it. Then the agents call later and note the efficiency obtained. If too much has been burned, steps are taken to correct the fault. This supervision of the purchase continues until such time as the former buyer and user of anthracite is convinced that the substitute is as efficient as coal. With vastly cheaper cost there is only one answer: We don't sell him any more anthracite."

The operating head then goes on to state that the opposition to the Coal Tax Law was based on the fact that the anthracite producer felt that he had lost his grip on the market and could not continue to sell his product if the cost of it were unduly increased.

Hocking Valley Operators Hold Miners to Their Promise

To remove any misapprehension as to the standing of the Hocking Valley operators it would be well to quote in full the clause in the agreement inserted by them when the contract was made on July 3, 1914. This clause was given full assent by the miners and is binding on them morally and has as much legal force as any contract can have which is made with an unincorporated association. The clause to which reference has been made is: "The operators in accepting the miners' proposition of this date do so with the understanding, and upon the representation of the United Mine Workers of America, that the scale of rates and the conditions are to be made to apply to all subdistricts of the state."

Even union officials concede that in order to induce the eastern Ohio operators to agree to the scale rates imposed on all operators in Ohio, concessions in the "conditions" under which the mines were conducted were made to the eastern Ohio operators.

The miners in the Hocking Valley are beginning to realize that they must concede these "conditions" to the operators, and a meeting of subdistrict No. 1 of the United Mine Workers of America was called to meet at Athens on Monday, Sept. 27, by Sanford Snyder, president, and Conrad Wein, secretary-treasurer of the subdistrict.

This meeting was called to discuss the demands of the Sunday Creek Coal Co. It is said that the members of the union are urging their officials to make the concessions demanded. The miners in the Hocking Valley and their families are much impoverished, and ways and means of relieving the destitution will also be discussed. There are approximately 8,000 miners in the subdistrict.

The Ohio Utilities Commission has postponed its hearings on the coal-freight rates. They were to be resumed Oct. 5, but upon the application of the railroads they have been postponed until Oct. 12. In the meantime the experts engaged by the commission are continuing the work of examining the books and documents of the Hocking Valley Ry. The books of the Toledo & Ohio Central Ry. will also be examined.

Miners Are Siding with Operators in West Virginia Just as They Did Recently in Ohio

The increase in freight rates proposed in West Virginia is making much stir throughout that state. The labor unions are strongly opposing it. Local Union No. 2925 at Coal Fork, W. Va., has passed resolutions against the increased rates. Thomas Haggerty, executive board member of the United Mine Workers of America, openly denounces the increase. In fact the union in West Virginia is solid with the operators of that state in condemning the change in railroad rates which has been made to please the union and operators in the State of Ohio.

Mr. Haggerty's remarks are interesting and would have an immense validity were it the duty of the United States Government to see that the miners in any one part of the country could compete with those everywhere else. His argument could be fortified by taking the freight rates to the States of Washington or Colorado, and he could then prove that the miners of West Virginia would have to work for nothing or less than nothing in order to enter the Western market.

He says: "If the new railroad rate is put into effect the Kanawha and New River fields will be forced to close down altogether, but the Fairmont, Guyan, Big Sandy and northeastern Kentucky fields might be able to pull through because of their low production cost. None of the last-named sections have been organized and the men are compelled to work for a mere pittance. If the railroads achieve their purpose we never will be able to unionize those fields, because the production cost will be so great it would be an economic impossibility to get a wage increase.

"In the Kanawha field the limit already has been reached. The operators here now have to carry at least a 4c. net differential to compete in the Western market. If anything was added to that they would have to suspend operation. The cost of undercutting and loading coal in the Pittsburgh bed of Ohio is 47c. per ton. Here the same cost is only 32½c., and adding the 25c. differential gives a total charge of 57½c., leaving a net differential of 10½c. in favor of Ohio. In No. 5 seam the undercutting and loading cost is 27c. per ton, to which must be added the 25c. freight differential now in force. This makes No. 5 coal cost 52c.; while that in Ohio is only 47c. No. 2 gas coal is mined and loaded for 26c. per ton, and when burdened with the freight differential costs 51c. So even in this case also there is already a differential of 4c. in favor of Ohio.

Miners Want the Operators to Combine to Raise Prices

Mr. Haggerty announced further that the international executive board of the United Mine Workers of America, at its annual meeting in Indianapolis, appointed a committee composed of John T. White, Frank Hayes and William Green, president, vice-president and secretary-treasurer respectively of the union, to appear with the representatives of the operators before Congress next winter to secure an amendment to the Sherman law, by which the operators may be allowed to combine and ask for a price for coal which would guarantee better wages to their workmen.

An attempt is being made to show that the railroads in Ohio will lose in business more than they will gain by the increased rate, but they will console themselves by remembering that it will not hurt them as much as would a 15c. drop in the freight rates in Ohio, which appears to be the alternative. In all probability the increase in West Virginia will stave off the decrease in Ohio, as the railroads purposed when they asked for an increased rate.

There is a threat to bring Ohio to terms by putting a heavy tax on West Virginia gas. This would be only another gift to the Ohio coal producers and another blow to the West Virginia operators and population. An embargo or an export tax is always an unfortunate form of revenge.

Speaking at the Rotary Club in Zanesville, T. A. McIntire, a wholesale coal dealer, said that Columbus is using 70 per cent. of outstate coal, Newark 43 per cent., Cincinnati 92 per cent., Dayton 78 per cent. and Cleveland and Toledo 82 per cent. In 1911 75 per cent. of the coal hauled by the Pennsylvania R.R. was Ohio coal. Now less than 25 per cent. is from that state. In that same year 43 per cent. of the coal carried by the Baltimore & Ohio R.R. was from Ohio, and now 98 per cent. of the coal comes from other states. Ohio was third in coal production in 1911 and now is fifth.

The Mound City Coal Co. at Moundsville, W. Va., has been idle since Sept. 15, being apparently unable to pay its men for lack of funds. The men have engaged J. Howard Holt as counsel to bring proceedings in bankruptcy.

Order of Court Permits Miners to Pay Check-Off to Anyone

An order of the court in the case of Thomas Cairns, president of District No. 17, against the Boomer Coal and Coke Co., has been entered upon agreement of all counsel. It provides that the check-off be paid to W. L. Wehrle, who is appointed a special receiver for the court. It further orders that any miners who may have heretofore authorized the Boomer company to check off money from their pay for the use of the union, may by written request withdraw that authorization for any union dues which may be, or which now are, collectible. Moreover, it gives the miners the right to have future collections for the check-off paid to themselves, or to such persons as they may severally designate. This right can be secured by an employee on written application to the Boomer Coal and Coke Co.

Apparently the miners in District No. 30 have won everything but their rights to what they have already paid. They are free to subsidize any organization they please from the present date onward.

In Iowa a coal miner whose leg was broken and back injured is trying to have 300 times his average working-day wage taken as the basis for his compensation. Senator John T. Clarkson, of Albia, is representing him. H. H. Stipp, the attorney for the coal company, is urging that, as the mines do not work through the whole year, a fifty-second part of the whole yearly wage should be the basis for figuring the monthly compensation. Richards, the plaintiff, worked only 224 days last year.

Mr. Rockefeller Declares in Favor of the Open Shop

As stated in last week's issue of "Coal Age," John D. Rockefeller, Jr., visited his employees in Colorado, and on Sept. 22 reached the village of Sopris, where he interviewed the children in the model school. At that same town Mr. Rockefeller inspected a number of disreputable houses built on the Colorado Fuel and Iron Co.'s ground by foreign miners. These the company purposes to buy and tear down, but the officials expect there will be some trouble, as the owners like to keep possession of their sad quarters, where the ground rent rarely exceeds a dollar a year.

At the same time the company feels that the presence of these unfit dwellings is discreditable to them and not to the advantage of their men, and they are determined to oust the tenants and replace the hovels with decent dwellings. After a visit to Morley and Starkville, the party returned to Trinidad and the trip to the mining camps was complete.

Everywhere he went Mr. Rockefeller was well received. The only displeasing event being an attempt on the part of a negro to talk him to death. On the 24th Mr. Rockefeller was at Pueblo going through the big mill and later he went through the company's hospital at Minnequa with Dr. R. W. Corwin, the white-bearded chief surgeon.

But the furies are following Mr. Rockefeller. The president and secretary of the Women's Justice League of Denver have met him and want him to meet the union officials. Mr. Rockefeller declares he is willing to meet anyone, but he has declared strongly for the "open shop." W. L. Mackenzie King, who is accompanying Mr. Rockefeller, has stated that the company is willing to meet its employees and arrange the terms of employment. He has declared that no discrimination would be made against the United Mine Workers, but he insists that the company will not recognize the union.

Ventilating in Rescue and Other Work

In *Coal Age* of Feb. 10, 1912, was published an illustration of an Austrian device for approaching mine fires—a collapsible air duct which could be strung from the roof and by which the foul air of combustion could be drawn away.

Of course given a slow fire and strong draft such as should be obtained by a small fan, an air duct of this type could be laid on the floor and would give satisfaction. Such a duct can be made of the "Flexoid" tubing manufactured by the Bemis Bros. Bag Co. The tube is made of heavy canvas reinforced with a composition which is forced into and becomes part of the texture of the goods. The usual sizes are 10, 12, 16 and 24 in. in diameter and from 100 to 200 ft. in length.

One man can carry a 100-ft. section on his shoulder. He can unload it wherever needed and then rapidly unroll it. It could be used not only in cases of fire fighting but also in rescue work. The recent tunnel driving at Archbald, Penn., through a rockfall to bring out four entombed men would have been more rapidly and healthfully performed had some such return been provided.

In many places it is necessary to drive ahead of return airways using air boxes, and they are often extended without any suitable means of securing ventilation. These tubes provide a speedy way of coursing the air, and one which can be readily dismantled for firing and renewed as soon as the blast has been fired.

The tubing is so air-tight that it has been used for temporary water diversion in bridge and culvert work. It is also furnished flat in large sheets for covering newly placed concrete. When the turbine is made to pass a sharp angle a few wood hoops will enable the pipe to be kept wide open, but on narrow turns the draft if reaching 3 in. of water gage will fully provide for this necessity. It is said that air can be delivered with a gage of 3 in. a distance of 1,600 ft. away from the blower, and the large sizes of pipe are delivering 10,000 cu.ft. of air.

Like many other devices used in the mines, Flexoid was first developed for use on the surface. Thomas Connor & Sons, of Greensburg, Penn., were constructing the Mill Creek sewer and the firm took up the matter with the Bemis Bros. Bag Co., of St. Louis, Mo., and the flexible conduit was the outcome. The cost of the duct is only about half that of galvanized-iron pipe, and being smooth and slick inside, air travels readily along it.

If the duct is crushed by a fall of rock or coal it will readily correct the deformation as soon as the weight is removed. A metal conduit will not do this. Moreover, a Flexoid conduit can be patched with needle and thread, whereas the repair of a severely dinged metal air duct is injured beyond any such renovation. Even if a metal duct can be straightened, the work takes some time.

Air ducts like these can also be used in shaft sinking. The need for temporary air conduits in many places has long been apparent, but as the methods provided are so cumbersome the tendency has been to put up with bad air, its risks and unhealthfulness rather than submit to the inconveniences involved in temporary provision for air coursing. The use of the Flexoid duct may hereafter make unnecessary our present masterful practice of watchfully waiting on nature.

Editorials

Do Safety Methods Succeed?

Increasing the number of men in a mine introduces a new risk, and for this reason there are occasional doubters as to whether the many safety inspectors will prove the value of their services. The late Fred C. Keighley used to tell one of his own unfortunate experiences in promoting safety. He was afraid his headings were too narrow and that some driver or workman would be pinched in the roadways, though they were by no means as constricted as might be found elsewhere. He had the work of widening almost done when the roof fell while one man was taking a side cut in a heading, and the very fact of securing safety added to the toll of victims.

It is therefore refreshing to hear about the successful campaign of the Susquehanna Coal Co., as related last Saturday by General Manager R. A. Quin at the Edgewood Park Meet of the Susquehanna and the Lytle concerns. The companies have 200 rescuemen drilled in the use of breathing apparatus, 325 first-aid men, not including those who after training have been advanced to higher position; 50 safety inspectors employed by the company to provide for the protection of their men and 475 persons employed as foremen and assistant foremen and in like positions, whose duties while partly economic are first and foremost to seek safety.

Roughly there are 1,000 men employed to save lives and 13,000 men to be protected. Mr. Quin declared that as a result of the renewed effort to guard their men from danger the fatal accidents in the first eight months in 1915 were only 17, against 32 in the previous year. He regarded it, as indeed all must, as a full recompense for the time and money expended.

It will be seen that there are 50 men out of the 1,000 whose sole work is safety. The lowered death rate is probably almost wholly their work, as the first-aid and rescuemen and the foremen of all kinds were as numerous a year ago as now. A saving of the lives of 15 employees by adding 50 men to the force is a considerable achievement, and it results largely from the fact that the men are as keen for safety as the company. The spirit has permeated through the collieries.

Morris Williams, the president, drew attention to the fact that safety-first, first-aid and workmen's compensation were achievements of the last ten years. The movements would have been declared chimerical a decade ago. He himself could recall the day when a man had his leg broken in a working place next to his own. The unfortunate miner was carried to his home by men who deemed themselves considerate. His bones grated on one another and his groans were frightful to hear. He was lowered down the breast and then loaded into a car, without any care. All sorts of mishandling were perpetrated by his well-meaning friends. It is different today, and the saving in life, in pain and in loss to the family and to humanity has been large.

As he said, the compensation movement is not less important. "Something which is the workman's right and always was his right," Morris Williams declared it, adding that it was "nothing but common justice." The future indeed looks bright. The spirit of the Susquehanna employees seems to assure us that none of the dreaded effects of compensation will be felt. Their willingness to do their part in safety-first and first-aid is a warrent that they will see that no man is compensated who does not need it.

Is Our Conception of Mine Discipline Changing?

Some years ago a rather prominent student of sociology, speaking of a certain class of American citizens, said: "In their pulpits much is said of truth, honesty and virtue, but they really have no adequate conception of the meaning of these words."

When a coal man turns from the pressing questions of cost, efficiency and mining methods long enough to dwell upon the refinements of mining you hear more or less about "discipline." Probably no other word has been brought more into requisition in the discussions of remedial measures for all mining troubles, especially mine accidents. The lack of discipline, to judge from the remarks we hear, is the source of almost all our woes.

In actual practice you will find men advocating treatment of the miner varying all the way from serving him his breakfast in bed to "beating his head off with a pick handle." We often hear it stated that we are not able to get the "old-time" discipline. Many sighs are wasted for the fleshpots of those glorious days when the whip cracked and every fellow jumped. We are all about ready to admit that there has been a rather rapid breaking down of the thing we used to conceive as discipline.

It is a pathetic spectacle to see our old men of iron, with a few faithful old employees around them, striving to beat back to the standards of the early days. They probably feel that with the coöperation of their neighbors the tide might still be turned back. Perhaps. But their neighbors are newcomers, who think they have read the signs of the times correctly—the times when concession, compromise and defeat are reckoned with and the half loaf is not spurned.

With our National Industrial Commission disagreeing, and our former Secretary of State declaring that old systems of force have passed, those who employ men are frequently inclined to take stock of their individual fitness to survive. A man who has not physical courage is apt to vote for a system in which the minimum of that quality is required; but physical courage is still the mainspring back of all successful discipline, and always has been.

However, there is another quality—perhaps rarer in its combination with "nerve"—for which the present-day disciplinarian of mining men needs to search himself

diligently; that is the willingness to risk a misinterpretation of his reservations pending the adjustments to the standards which the great public seems to be demanding. True, the only way you can prove that you will fight is to fight, yet there is some merit in being willing to withhold the proof. It cannot be denied that there is a general leaning toward the old "fight-at-the-drop-of-the-hat" conception of a successful disciplinarian; hence, because not much of that is done now there is a general feeling that we have no discipline.

If the old-time discipline is gone, what has become of the "punch" that went into the make-up of the old-time disciplinarian? One theory is that it has been "cast out" of the bosses by repression and has "entered into" the men. Anyway, anything like discipline according to old standards seems to require a higher order of nerve than ever before—a nerve that is able to get results while withholding the ocular proof of its existence.

While making inquiry after the "punch" that seems to have departed from the old order of things, how about the word "obey"? Perhaps if the conception of the meaning of mine discipline is changing, it is due more to the breaking down of the one vital element of discipline—obedience. The word has even been taken out of the marriage contract, and has become entirely bookish. We scarcely hear it any more, unless at a church service.

Is there any analogy between the industrial war that has been going on for some years and the European uprising against "militarism?" Is the leaning of labor toward the Allies any indication of this analogy? The old guard among the coal operators may resent their conception of discipline as being termed "militarism," but the press in some localities is even calling it "feudalism." Now the men who are trying to "meet the situation" find themselves wondering just what intermediate position they are to take in order to get that much-coveted condition spoken of as mine discipline.

The Department of Mines in one state, in its annual report and over the signature of its chief, says: "Strict discipline, vigorously enforced by the mine officials, would reduce the number of accidents at least one-half." Some time afterward a deputy inspector was examining a mine in company with the superintendent. A miner was discovered shooting off the solid in violation of law and was not prosecuted. At another mine the inspector made a report to his chief, stating that more than the legal number of men were being taken up on a hoist. The general manager, seeing the report before it was sent in, was indignant and addressed the deputy inspector as follows:

"All my employees have been instructed in the law in regard to the number permitted on a trip. This law has been incorporated in my mining rules and posted at the top and bottom of the plane. My superintendents and myself have something more to do than sit and count the number of men who get on the trip each morning. If you have observed any violation, your duty is clear, make the arrest, or modify your report."

No arrest was made. Probably in this instance it could be shown that both inspector and manager took extreme positions.

A third instance, however, shows a little plainer why mine discipline may be undergoing a change. Another state inspector was making his rounds in a mine when a shot was fired that contained about double the charge that was permissible. He was "horrified" and said: "That man should be discharged." The superintendent promptly discharged him. A few days later the inspector made a special trip to urge the man's reinstatement.

As most of us understand it, the objection to militarism is not its efficiency but the tendency to make it paramount. However, it seems that anything like discipline must partake of the qualities of militarism—that is, authority and obedience. Hence, the question arises, Is there not a tendency to eliminate authority and obedience from discipline; and in any conception of discipline without these vital elements, has discipline itself not been wholly lost?

Continuing the analogy, has not the conception of coöperation had much to do with the breaking down of the old standards? Why does not discipline mean the same thing when applied to an army of industrial units as it is supposed to mean when applied to soldiers, namely, the recognition of authority and obedience? There seems to be a double opposition to militarism—the legitimate objection to an efficient soldiery dominating civil affairs and the tendency to oppose the elements themselves that make for military efficiency. Coöperation is certainly a concomitant of the other virtues of great orderly movements, but with the passing of the elements of discipline, coöperation, when applied to mining, often has come to mean the elimination of the old-time discipline and the substitution of a system whereby those in authority, or supposed to be, first ascertain whether an order will be acceptable to the men and whether permission is granted to issue the order.

But the question propounded in the beginning was meant to bring out the point as to whether those who have so much to say about discipline are hypocritical, or have they really some new conception of discipline, as a product of concession, compromise and yielding, with the authority, the obedience and the "punch" left out. I think we can look squarely at the proposition without too much repining. When we advocate mine discipline, do we mean the old thing or something else? Did the writer of "I Didn't Raise My Boy to Be a Soldier" write against the domination of a military class or voice a protest against learning too much discipline? And is the popularity wholly one of war issues, or could it mean "I Didn't Raise My Boy to Recognize Superior Officers"?

It would be a beautiful sight in going through a mine to see drivers and slatemen and miners, all rushing to help put on a derailed car (or possibly more beautiful to see the track in such shape that a car would not get off). What you are more apt to see is the whole heading tied up and a dayman hunting for the fellow whose job it is to replace cars. This man, when found, perhaps waits for a mule to haul a jack, which, but for the division of labor necessary to "coöperation" might be carried.

Still following the extremist's idea of coöperation, the mine foreman goes into a room where there is some bad slate. "Hello, John, you've got some bad slate here. I'd have brought a prop with me, but I left it with Joe." Joe having filled his car, drops in to see how John is getting along. "L'mme set it while you finish your car from the other side. There's one right back here." "I'll hold it for you," says the mine boss.

The mourner after the old-time discipline, reporting a similar occurrence, will state that it would actually happen about like this: "Here, are you trying to commit suicide? Put a post there" (marking the place). John, without looking up, answers sullenly: "There ain't been no posts here for a week." Mine foreman: "There are a dozen only a step back; you better set one." John (still shoveling): "Too short." Mine foreman (measuring): "Here are several just right. Don't wait till that falls on you." A half hour later the driver reports an accident in John's room. The foreman hurries in and finds Joe "coöperating" in getting a ton of slate off John's neck.

As is usually the case the truth lies between the two extremes indicated. The discipline which is going to obtain in the future, as a result of the changes now taking place, probably lies somewhere between a military conciseness and the coöperation of brotherly love.

Mine managers of the old school will never again see the old-time discipline, and the advocate of a coöperation without any "punch" may have to wait a while. In the meanwhile "nerve," "ginger," "pep" and "punch" are as valuable as ever, and every man who welcomes "denatured" discipline because it coincides with his own temperament is apt to command an article which will go a long way toward further changing the standard.

The pessimist may feel that the decline is tending toward anarchy, but the chances are that mine discipline never was quite what we remember it as having been, and if there is a world movement in which authority and obedience breaks down, it will cover more than one lifetime. Perhaps it is better to conduct a "masterly retreat" than to stand against overwhelming odds, but as between the last stand of the old guard and the inglorious rout of those offering an easy victory to anarchy, the choice should not be difficult.

Sociological Department

Philadelphia & Reading Meet

SYNOPSIS—The "Reading" meet is a historical event, for the work of that corporation in first aid led all others in the United States. Drilling exercises are becoming popular.

The Philadelphia & Reading Coal and Iron Co. held its eleventh annual competitive drill at Lakeside Park, East Mahanoy Junction, near Tamaqua, Penn., on Saturday, Sept. 18. Emphasis may well be laid upon the ordinal adjective "eleventh," for no other mining company in the United States can lay claim to so long a period of first-aid activity as can the "Reading." The Pennsylvania Coal Co. and the Hillside Coal and Iron Co. are close competitors, but they did not hold their first meet till a year later. So the recent competition at Valley View of those two anthracite companies in the Luzerne field was only the tenth annual meet.

W. J. RICHARDS ADDRESSING THE WINNERS

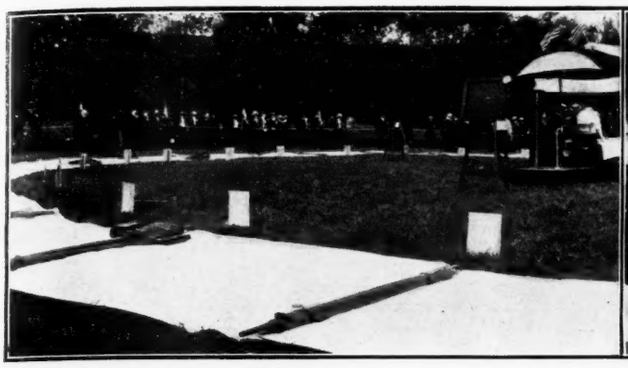
It is customary to say when attending an event of this kind that the work is better than ever every year. However, those who have followed the work of the teams at Lakeside Park realize that the Philadelphia and Reading miners early set such a fast pace that it is hard if not impossible to beat it.

Here of all meets is the best place to go if one would see model roller bandaging. This has been true for many years. This year some new developments have taken place, but they are not in the direction of new technique. The litter drill has been raised to an important feature, and setting-up exercises and military drills, while not performed under company direction, are being introduced with the approval of everyone.

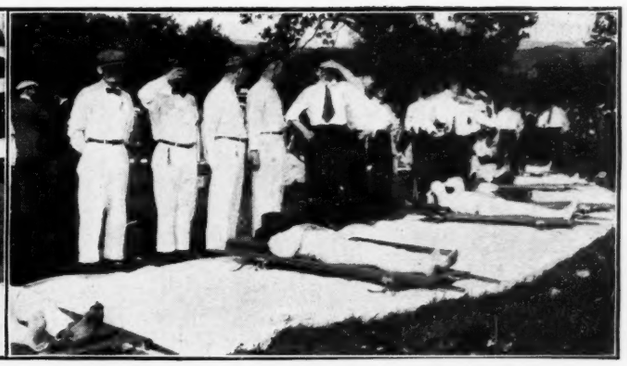
The field used to be rectangular, but this year was made round, and the new shape had its advantages. In the center was a marquee, in which the records were kept, and a roped-off pathway led from this tent to the outer circle of the contest ground. In this way perfect order was maintained, which was the more necessary as the teams in the grounds were changed after every group of events.

E. T. Stotesbury, A director of the Reading | Oakley C. Curtis, Governor of Maine | R. J. Montgomery, sales agent of the Reading

SOME OF THE NOTABLES PRESENT



THE FIELD WAS METHODICALLY ARRANGED SO AS TO PROVIDE THE UTMOST DISPATCH



THE MEN OF EACH DIVISION PERFORMED THE SAME EVENT IN ELIMINATION TRIALS

In one event the victim was supposed to be burned on the head, face, chest, arm and hand—a terribly severe case, one would imagine. However, the men with one accord sat the patient up when bandaging him, as if there was nothing to dread from shock. This is mentioned particularly because there are many meets where the dressing, in such a posture, of a patient so frightfully burned would be penalized heavily.

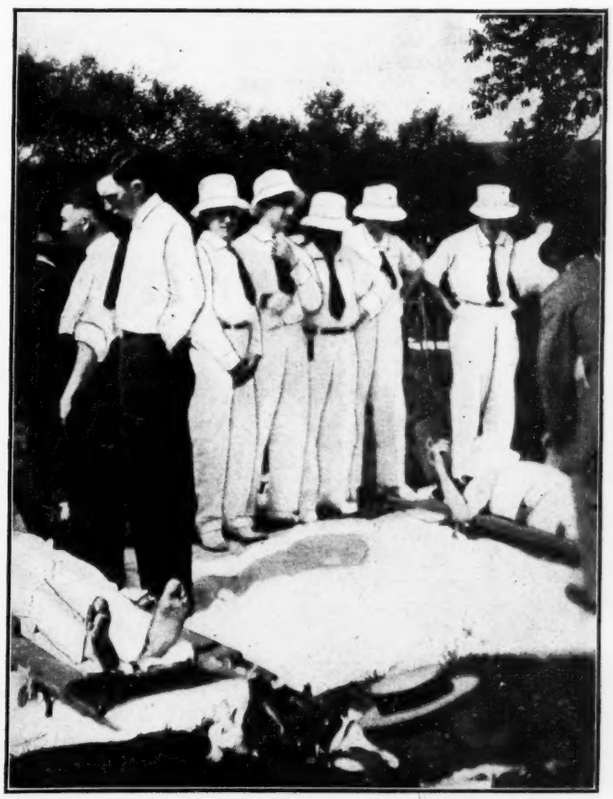
The officials of the American Red Cross and the American Mine Safety Association urge that a man whose heart action has been weakened by such severe burns should be laid at full length, so that his heart will be subjected to less strain. Those who take a contrary view state that a victim, if at all conscious, is always anxious to sit up and will struggle to do so, and if he does his heart action will be even more seriously affected. Moreover, the bandages are more readily adjusted on a sitting man.

Fracture of the spine was treated by some of the teams without the care which is generally exercised in such work. One corps was even observed with the patient partly doubled up prior to splinting. Still it must not be thought that lack of care was in any sense frequent. In most cases the teams were as careful to do the work in the right way as to secure a perfect result for the judges to view.

The various districts each drew a problem from among ten presented. This problem was then submitted to all the corps in the district. In order to save time, three districts held their competitions simultaneously. The winning corps in each district then competed in the litter drill, which took place after dinner, the evolutions being: Form corps; procure litter; open litter; close litter; proceed to patient, double time; place patient on litter, examine for and dress one injury; transport patient to ambulance and place in the vehicle; return to place of formation; dismiss. Time allowance, 12 min. At the completion of this problem the corps executed such other movements with the litter as they saw fit, an additional time limit of 5 min. being accorded.

Addresses were made by W. J. Richards, president of the Philadelphia and Reading Coal and Iron Co., and by Governor Oakley C. Curtis of Maine. The blue ribbon and pennants were awarded to the Brookside colliery team by Mrs. E. T. Stotesbury. Pine Knot, which was second, was beribboned by Miss Richards, and Wadesville,

A DRESSING FOR A FRACTURE OF THE SKULL AND INJURY TO THE EYE



SOME OF THE TEAMS HAD AN EXTREMELY NATTY AND PLEASING APPEARANCE

which was third, by Miss Smith. The other seven corps which led their districts were North Franklin, Suffolk Inside, Alaska, West Shenandoah, Mahanoy City Inside, Draper Outside and Bast City.

Exhibition Drills Introduced for First Time

After the speeches and presentations some setting-up exercises were performed and also some drills. The miners in the "lower region" work mostly in high coal, and of course being in hard coal do no undermining. They are therefore not disposed to stoop or carry themselves like bituminous miners who undercut coal in low seams.

There are few miners therefore who need setting up exercises and drill less than these Reading employees. Still drill is a good exercise for anyone and the practice of it will undoubtedly add to the excellent bearing of the Reading first-aid men. The public judges a man by his outward appearance and nothing will make it revise its present unfair estimate of miners so much as squads of men with a military bearing such as the Reading bids fair soon to have.

Rescue and First-Aid Work in Southwestern Illinois.

Special Correspondence

SYNOPSIS—First aid and mine rescue form the leading events at the Pinckneyville, Ill., fair. The one-man event is an open contest, many of the individuals taking part in it representing only themselves, as is customary in athletic sports.

The first mine-explosion demonstration and the first-aid contest ever held in connection with the mines of southwestern Illinois were staged Wednesday, Sept. 22, at the fair grounds in Pinckneyville, Perry County. It was one of the attractions of the Perry County Fair.

This arrangement was made possible through the efforts of Thomas Jeremiah, one of the directors of the fair association and also a member of the Illinois Mine-Rescue Station Commission. He is one of the operator representatives in that body. The medals given as prizes were provided jointly by the Illinois Mine-Rescue Station Commission and the Perry County Fair Association.

DEMONSTRATION OF A GAS EXPLOSION IN A MINE

An imitation mine gallery, with five rooms leading from it, was constructed of timber and tar paper, the whole structure being 45 ft. long, 18 ft. wide and about 7 ft. high. To form this representation of a mine 20 rolls of tar paper were nailed to thin wooden strips. Another illustration shows the entrance to the gallery and the team from the Benton, Ill., Rescue Station wearing the oxygen-breathing apparatus and entering the mine. The door seen at the left of the illustration leads into a testing room, which was filled at the time of the demonstration with a dense smoke, and in this atmosphere the oxygen apparatus was tested before the men entered the mine. As a dense yellow smoke poured out of the door when opened it was evident to the watching crowd that before a person could enter the room some form of breathing apparatus was necessary.

Before the main demonstration an exhibit was made of what was supposed to represented the old-fashioned way of handling an injured person. The victim was trundled along in a jolting wheelbarrow to his manifest discomfort. This demonstration supplied the comic element that the public nowadays seems to demand even in connection with the most serious situations.

The mine demonstration began with the entrance of the day shift into the mine, instructions being given by the manager to each man as he entered. Another realistic touch was an altercation between the men in regard to the work to be done and the method of doing it.

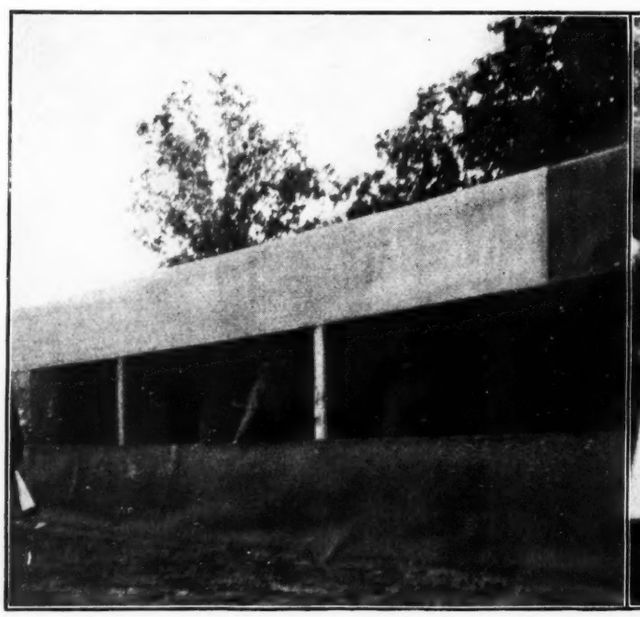
Soon after the party had entered an explosion was heard in the last room and word came to the manager still at the mine entrance that men had been injured by a gas explosion. He at once telephoned for assistance to the Illinois Mine-Rescue Station at Benton and in a few minutes an automobile dashed up bringing the Benton rescue team and supplies. An ambulance also soon followed.

The team quickly put on the oxygen apparatus and after testing it in the smoke room took its position along the life line and entered the mine, which by that time was filled with a dense smoke. Soon one supposedly injured man was brought out, followed closely by another, and both were placed in the ambulance and hurried to the hospital.

CONTESTS FOR TEAMS AND INDIVIDUALS

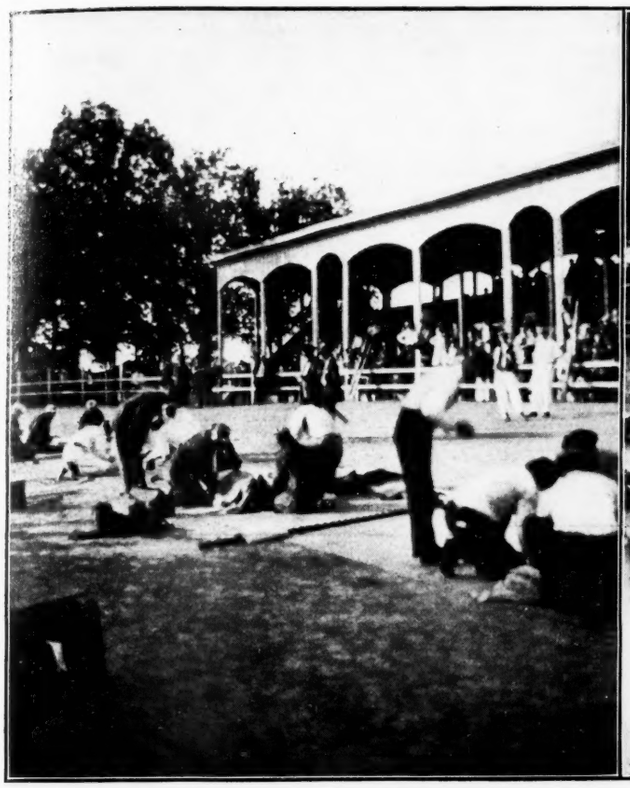
There were two parts to the first-aid contest—first, the team event, in which six teams competed, and then a one-man event, in which not more than two from each team were entered. In the latter individuals were also permitted to compete if not connected with any of the teams entering the former contest.

The problem given in the team contest was: Compound fracture of the left thigh; a wound 3 in. long in calf of right leg; a cut on the outer surface of the right forearm, with

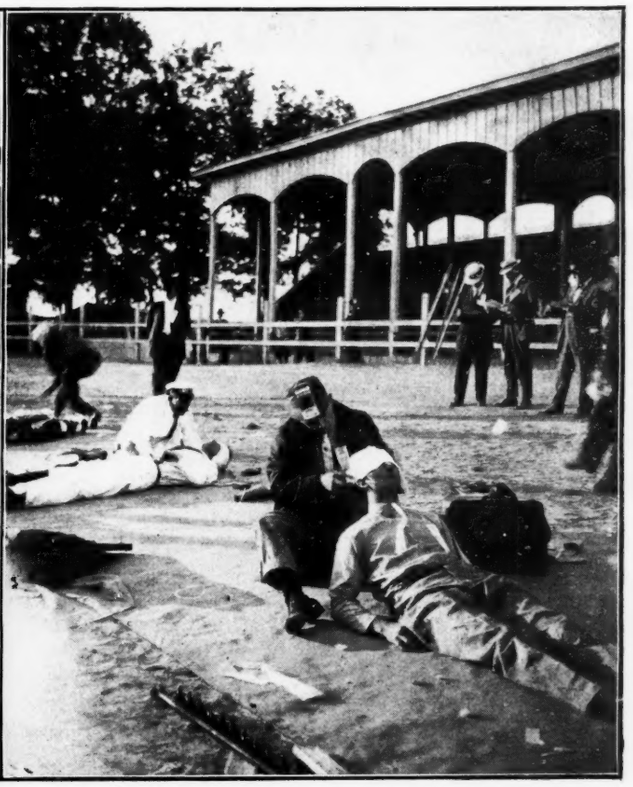


AN IMITATION MINE FOR RESCUE DEMONSTRATION

MEN ENTERING THE MINE-RESCUE GALLERY



FULL-TEAM CONTEST



INDIVIDUAL EVENT

profuse bleeding. Treat and carry patient on an improvised stretcher a distance of 25 yd.

Ten minutes were allowed for the work. The competing teams were: Big Creek Coal Co., St. David; Wilson Richer mine, Pinckneyville; Mining Bureau of Inspection, Peoria; Producers Coal Co., West Frankfort; Majestic Coal Co. Du Quoin; Big Muddy Coal and Iron Co., Herrin, and Gillespie Independent First-Aid Association, Gillespie. The judges were Dr. G. F. Mead, of Pinckneyville; Dr. Byford Webb, of West Frankfort, and Dr. W. Daggert, of DuQuoin. The team from the Producers Coal Co., West Frankfort, won first place and the corps from DuQuoin and Herrin tied for second position. The problem given to break the tie was the treatment of a crushed pelvis. The Herrin team was awarded second prize and the DuQuoin team third.

In the one-man event there were so many contestants that it was necessary to take them in two divisions. All had the same problem, but, while the first division was contesting, the others were sent to a distant part of the grounds, so that they might not profit by observation of the methods of the first group. The problem given was:

Man has been struck by a fall of slate and his left ear has been torn off, a contused wound is found over his right eye, his scalp is lacerated and there is a wound 4 in. long on the right side of his head.

The time allowed for the event was 10 min. So close was the contest that three received the same mark for first place. To decide the event these three were given the problem: Thumb and index finger of right hand have been cut off, severe bright-red arterial bleeding resulting. Treat.

The winners of the event were: First, Burnett and Yuill, of Herrin; second, Nolte and Dunning, of DuQuoin, and third, Avoskee and Campbell, of Pinckneyville.

The local arrangements for the meet were made by James Corral, superintendent of the Benton Rescue Station, and Charles Swan, assistant in charge of the DuQuoin substation of the Illinois Mine-Rescue Service. The announcer of events was G. T. Powell, United States Bureau of Mines, Evansville, Ind., and the recorder was H. I. Smith, mining engineer, United States Bureau of Mines, Urbana, Ill.

The interest taken in the event by the miners, operators and citizens of Perry and adjoining counties showed gratifying appreciation of the first-aid movement.

A Disorderly Workshop contributes to the number of accidents. Do not leave waste around which may catch fire, or leave material lying on the floor on which people may stumble. Safe places should be provided for the storage of all supplies.

COMING MEETINGS

Fourth Annual Mine Safety Demonstration of the Ellsworth Collieries Co. will be held Oct. 12 at Ellsworth, Penn.

National Safety Council will hold its fourth annual safety council at the Bellevue-Stratford Hotel, Philadelphia, Penn., Oct. 19-21, 1915. Secretary, W. H. Cameron, Chicago, Ill.

Engineers Society of Northeastern Pennsylvania will hold a special meeting at its rooms, 415 North Washington Ave., Scranton, Penn., on Thursday, Oct. 28, 1915, at 8 p.m. The object of the meeting is to take corporate action on the proposed issue of $15,000 4-per cent. 10-year bonds, for the purpose of refunding the outstanding floating indebtedness of the society and furnishing money for its general purposes. T. F. McKenna is the secretary.

First Annual State-Wide First-Aid Meet will be held at Bicknell, Ind., Oct. 30, 1915, under the auspices of the local unions of the United Mine Workers of America and the operators of Knox County, the Bureau of Mines and the American Mine Safety Association. William Bogle, Bicknell, Ind., is the secretary.

United Mine Workers of America will hold its annual convention in St. Louis, Mo., beginning Jan. 17 and continuing for three weeks. William Green, secretary-treasurer, 1102-1109 Merchants National Bank Bldg., Indianapolis, Ind.

Next Week

The Oct. 9 issue of *Coal Age* will contain a number of safety and sociological articles that were crowded out of this special issue. We will also publish next week the first installment of a valuable article covering "Motor Haulage and Side Tracks in Coal Mines." No foreman, superintendent or manager can afford to miss this article. Other articles will deal with "Coal-Storage Plants," "Car-Supply Outlook," "Coal Mining by Longwall System," "Repairing Broken Tapes," "Accidents to Boilers at Coal Mines," "Trees in the Life of a Coal-Mining Community" and descriptions of the various first-aid meets held in the different coal districts.

Discussion by Readers

Explosibility of Coal Dust

Letter No. 1—I have been watching with great interest the discussions on the prevention of mine explosions and have wondered that some of the correspondents had not referred to the editorial published in *Coal Age,* Aug. 21, p. 303, entitled "Explosibility of Coal Dust." The editorial treats the question of why one coal dust is more easily ignitable than another. This is a most interesting inquiry, which is receiving the closest attention at the hands of some investigators who are trying to discover the probable cause of this difference in coal. Their method is to examine under the microscope thin slices of coal, in the hopes of finding important physical differences that would lead to a solution of the problem.

The editorial, however, deals wholly with the water content of the coal and refers suggestively to the report of David J. Price and Harold H. Brown, of the Millers' Committee of Buffalo. This report, which is entitled "The Explosibility of Grain Dust," seems to indicate that the corn dust, having the higher percentage of moisture, was ignited more readily than that with a lower percentage of moisture. That is to say, as the percentage of moisture increased, the temperature of ignition of the dust was lower. It is interesting to note that this corroborates the experiments of Prof. H. B. Dixon, which he performed some years ago when investigating the rate of explosions in gases. Professor Dixon at that time proved that 5 per cent. of moisture present, in the form of steam, in an explosive mixture of gas and air gave the highest velocity and the greatest pressure in explosions. Some correspondence had with Professor Dixon at that time, if my memory serves me, did not throw any additional light on this important matter.

Now, I believe that there is, in all probability, some difference between the effects produced by hydroscopic water when present in the coal and that produced by dampness or moisture accumulated on the face of the coal as the result of spraying, which is the common practice in many mines. I believe that most persons who have studied the matter will agree with the statement at the close of the editorial, to the effect that "though moisture probably is a protection, it is not an unquestionable guarantee of safety."

In this connection I was much interested in the article entitled "Scientific Humidification," by J. I. Lyle, *Coal Age,* Sept. 4, p. 378. In his summary at the close of the article, however, Mr. Lyle fails to state what weight of water vapor he considers should be present in the air to obtain the desired effect.

Considering this subject from a practical standpoint, there is no doubt but that the dust floating in the mine air may be greatly reduced with advantage by the use of sprays located at certain distances apart in the airways. Also, the method often adopted of spraying the cars of coal before they are hauled out of the mine should prove efficacious in reducing the accumulation of dust on the haulage roads and its suspension in the air current traveling in the mine. It is generally admitted that the humidification of mine air to the point of saturation is not desirable in the mine, as such a degree of saturation is not conducive to the health of the mine workers.

Taking all these facts into consideration, one is led to conclude that the humidification of the mine ventilating current does not increase the safety of the mine, except as it prevents the absorption of moisture to that extent from the mine workings, rendering them dry and dusty. On the other hand, the hydroscopic water in the coal assists its disintegration, and it may be reasonably inferred that coals low in hydroscopic moisture will not be as readily held in suspension as dust in the air current, and the mining of such coal might therefore be accomplished under safer and more sanitary conditions.

JAMES ASHWORTH,
Mining Engineer.

Vancouver, B. C., Canada.

Preventing Mine Explosions

Letter No. 9—As the winter season again approaches, the question of the best means of preventing mine explosions becomes of increasing importance. On this account I want to draw attention to the method adopted by the Powhatan Coal and Coke Co., at Powhatan, W. Va. It would seem from the results obtained that the form of humidifier installed at this mine has solved the dust question and made it possible to keep the mine in a safe condition at all times, as far as the dust is concerned.

When once understood, the method is exceedingly simple. By means of a radiator consisting of a system of steam pipes placed on the intake air current the air is heated to a temperature higher than the temperature of the natural strata in the workings. In the use of this apparatus steam is injected into the air after the latter is heated by passing over the pipes. The heated air is able to carry a larger amount of moisture than would otherwise be possible, and while in this condition absorbs the steam as it issues from the ends of the pipes. No more steam is permitted to escape from the pipes than the air current will absorb. This is important in order to avoid the formation of fog in the entry beyond.

As the warm moist air comes in contact with the cooler walls of the mine a portion of its moisture is condensed, and the air flows through the workings in a saturated condition, which prevents the further absorption of moisture from the mine workings and the drying out of the mine. It is well known that an air current of 100,000 cu.ft. per min., when fully saturated at a temperature of 0 deg. F., will carry slightly less than a gallon of water as absorbed moisture, and each rise of 20 deg. approximately doubles the carrying capacity of the air. [At an average mine temperature of 62 deg. F. the capacity of air for carrying moisture is 12 gal. per 100,000 cu.ft. per minute.]

Inasmuch as most coals contain less than 15 per cent. of moisture—and, I believe, it has been shown that an explosion due to the ignition of dust floating in mine air

is possible when less than when 30 per cent. of moisture is present—it would seem that every practicable means should be employed for maintaining a high percentage of moisture in mines in order to reduce the possibility of an explosion from this cause to the lowest possible limit. In the humidification of the intake current passing into a mine it is evident that this must be effected at a temperature, as I have mentioned, higher than that of the natural strata in the mine.

The humidifier that I am about to describe has been installed and is in successful use not only in the mines of the Powhatan Coal and Coke Co., at Powhatan, but also in those of the Lynchburg Coal and Coke Co., at Kyle, and the Eureka Coal and Coke Co., at Eckman—all in this state. It is not claimed that this arrangement is new, having been installed in these mines for a number of years. At the time of installation the tests made by Walter Proctor, a mechanical engineer of Norfolk, showed satisfactory results in respect to maintaining a high percentage of humidity in the mine. More recently I have made tests that confirm these results as well as the monthly reports sent to my office by the company during the last two years.

The humidifier consists essentially of a series of 3-in. pipe lines arranged 20 in. center to center in the intake airway. The pipes are connected at the outby end with a steam main by means of cross-pipes, elbows and tees. There are over 40 of these pipes in the humidifier, which is 70 ft. in length, making a total of 3,000 lin.ft. of 3-in. pipe. They occupy the entire cross-section of the airway. The inby end of each pipe is fitted with a small nozzle spray, which distributes the steam as it issues from the pipe into the air. The water resulting from the condensation of the steam is conducted by a concrete drain to a sump prepared to receive it. Also, the condensation in the pipe line drains to a trap, from which it flows into the sump, which is drained by a small pump located in the intake airway outby from the humidifier.

Briefly described, my test at the Powhatan mine, Jan. 20, 1915, gave the following results: 8:25 a.m., intake airway, 103,000 cu.ft. per min.; relative humidity, 82 per cent.; 8:56 a.m., main entry, last breakthrough, 18,200 cu.ft. per min.; relative humidity, 95 per cent.; distance traveled by the air, 7,560 ft.; width of entry, 8½ ft.; 9:45 a.m., room 41, last breakthrough, 16,900 cu.ft. per min.; relative humidity, 95 per cent.; distance of this room from radiator, 6,000 ft.

Out of 28 similar tests made in this mine, four tests showed a relative humidity of 100 per cent.; one test, 97 per cent.; fifteen tests, 96 per cent.; six tests, 93 per cent.; and two tests, 89 per cent. The average relative humidity in these tests was 95.5 per cent. These figures speak for themselves as to the effectiveness of the humidifier installed at this mine, since the outside atmosphere at the time of making the test showed a relative humidity of only 41 per cent. The humidity on the return airway of this mine at times reached 100 per cent.

In closing, permit me to draw attention again to the basic principle that must be considered in the design of any successful humidifier for mine use. The failure of so many forms of apparatus installed for this purpose is due to the fact that they do not take this principle into account. I refer to the relative carrying capacity of the air current at different temperatures. It must be remembered that when the outside temperature is low, as in winter, the air entering the mine may be fully saturated, but as the temperature rises, owing to the heat of the mine, its capacity to absorb moisture is rapidly increased, being practically doubled for each 20 deg. of rise in temperature, and as a result the air passing through the mine is quite dry, although carrying the same weight of moisture in the air current. I think a full discussion of this subject is important at this time and believe that a general law governing the essential points, which I have stated, would be effective in reducing the number of dust explosions in mines.

LAWSON BLENKINSOPP,
Mine Inspector, 13th District.

Landgraff, W. Va.

Egyptian State Ry. Specifications

Referring to the editorial on the Egyptian State Ry.'s contract, *Coal Age*, Aug. 28, p. 344, permit me to offer the following comments:

As to the strike clause, cancellation can be made only after actual suspension of shipments. It requires the delivery of the entire tonnage, but allows an extension of time for deliveries.

Purchases in the open market on account of failure to deliver are not left to the "judgment of the buyer" but are only allowed under failure to deliver as per contract.

You say that the ash specification is not so exacting as the volatile requirement. Now, the latter is about 35 per cent. and not more than 40 per cent. of volatile combustible matter, while the ash requirement is about 6 per cent., both being on dry coal. I submit that 6 per cent. ash is a much more exacting requirement than the 35 to 40 per cent. volatile, even though 2 per cent. more is allowed before penalty begins.

Your criticism of the loading dispatch is not quite warranted, in my opinion. The contract says that the time allowed for loading commences from the time the vessels are ready to load. Even at Hampton Roads ships are sometimes ready to load days before loading actually begins, this being due to congestion of ships and delays to the coal at the piers. There is sometimes a shortage of coal, which delays loading even after it has been started.

The record time of loading at Hampton Roads, which you give, began when the ship had tied up at the pier, with hatches open; she might have been ready to load and out in the stream for two or three days. It is true of course that we can load ships faster than they can abroad, but their fastest loading is fairly good, being 4,000 tons in 3 hr. 40 min., 2,652 tons in 2 hr., 2,100 tons in 1 hr. 57 min.

You say that "with freights at $11 to $12 to Mediterranean ports the deposit required is excessive." Freights are not at any such figure now and have not been for some time. The present rates are about $9.28. The deposits required may seem excessive to us, but Egypt is a long way from the source of supply and the costs are high. The successful bidder on the Panama R.R. contract must put up a bond of not over $30,000.

Under the contract provisions you state: "It seems unlikely that American shippers will be enthusiastic about this particular business in Egypt." Inasmuch as there were 159 bidders on this contract, many of them United States shippers, it would seem that while possibly not enthusiastic, the American shippers were quite willing.

And finally you advance the opinion: "In future years . . . it may be that conditions will be modified and that American shippers will be successful competitors for such contracts." You do not seem to be aware that United States shippers have had a share of this particular contract for the last three years and have been awarded 60,000 tons of the business for this year, 90,000 tons going to Monmouthshire coals, the balance (of 360,000) not awarded as yet.

F. R. WADLEIGH.

Philadelphia, Penn.

Longwall vs. Room-and-Pillar Mining

Letter No. 4—In his letter No. 3, *Coal Age*, Sept. 11, p. 432, R. J. Brown cites a particular case of longwall mining adopted in a Northumberland mine, and adds, "The method proved an absolute failure." He should have given the particulars in regard to this mine so that we could judge correctly the cause of the failure. It is just these particulars that we all want to know whenever it is possible to obtain them.

Mr. Brown must bear in mind that there are more methods than one in longwall mining, and the cause of failure may have been the use of a method that was not adapted to the conditions existing in the seam. Perhaps when it was discovered that it was not a success, the operators hesitated to change their plan, fearing a like result would reward their efforts. I do not wish to reflect on the competency of the mine officials in that case, but only to emphasize the fact that the adoption of another method might have been rewarded with success.

To illustrate this point, permit me to cite an instance in my own experience. It occurred in a mine in West Yorkshire, England. An attempt was made, first, to work the mine on a longwall board-face, but it was found when the working faces were developed that the roof could not be supported by props, even by using cap-pieces a foot wide on top of the props. The operators were not discouraged, however, and at once adopted the plan of using split posts, which the men were required to set 4 ft. apart along the entire face of the coal. They soon found that this plan required too much deadwork. In their own words, the company was paying too much "consideration money" for the moving of dirt. The slate and shale roof would fall right up to the face, between the timbers. This was not only a menace to the workmen but produced much dirty coal.

After studying the matter, another plan was tried, which proved successful. A change was made from the "board-face" to the "end-on" method of driving. In other words, the longwall face was advanced on the ends or butts of the coal. This gave a greater support to the frail roof, although the miner was obliged to shear the coal at each roadway and mine or break it across the face until he reached the boundary of his working place. To explain more fully, this change from the "board-face" plan to the "end-on" method was necessitated because the first foot of the roof shale or slate was too friable to be supported when the coal was worked on the face.

I freely allow that the longwall method of mining cannot be applied under all conditions; but, under conditions favorable to its use, I maintain it is a superior method of mining than that of the room-and-pillar system. It does not appear to me that Mr. Brown will dispute this claim that the longwall method of mining, under favorable conditions, will give a lower cost of production and a more uniform output of coal, provided it is well managed by competent men.

We frequently see it stated that the longwall method has proved a failure in most American mines. It is more than probable that these failures have been caused by lack of judgment on the part of the officials in charge. There is one thing we must consider, and that is that many of these seams, owing to their thickness, require the building of good, substantial packwalls, for which suitable material must be selected. If this work is not well done, the result is a failure. The building of the packs is of far greater importance in the working of a seam 5 or 6 ft. thick on the longwall plan than when adopting the same method for the working of a 13- to 18-in. seam of coal.

In closing, I would ask in reference to the list of explosions given by Mr. Brown as having occurred in longwall mines, Are these as numerous as the explosions that occur in room-and-pillar mines? Explosions, in the latter case, occur with great frequency in newly opened mines, while the explosions in longwall mines have been largely due to the habit of gobbing the inferior coal in those districts. One could hardly expect that a mine that has been worked 50 years under such a practice could be immune from explosion. Another cause of trouble is the fact that the timbers are often left in the waste. These should all be taken out in longwall work, so that the roof can settle uniformly on the waste.

JOHN OLDROYD.

Fairmont, W. Va.

Prohibition and Welfare Work

Letter No. 4—I do not want to be understood as criticizing F. S. Johnson's good letter No. 3, *Coal Age*, Aug. 28, p. 350, but would like to give my own views concerning one remark he makes, which is as follows: "At times I have been inclined to thing that there is a certain amount of coddling indulgence permitted in our welfare work among the foreign-speaking miners."

The foreign-speaking miners form a large majority of the mine workers in the West Virginia coalfields. In my experience they do not want to be "coddled" any more than does the American miner, although I may say that we can all stand a certain amount of coddling at times. But when judging the foreign-speaking miner we must consider his circumstances. We must remember that this class of mine workers comes largely from countries where strong drink is to be found in almost every public place, and was sold, before the war, with scarcely any restriction. Indeed, in those countries strong drink is the leading feature wherever people are gathered for a good time, and these foreigners coming to our shorees naturally follow their long-formed habits and inclinations. They enjoy themselves most when there is plenty of booze at hand.

We recognize this as a bad habit and one that is opposed to the best training and efficiency of the worker; but as has been stated previously, "If you would put an end to a habit of any kind in men, women or children you must give them something in place of it." Few have the power to break away from a bad habit without

something is afforded to divert their thoughts into a different channel.

Mr. Johnson has referred to the different diversions furnished by the Y. M. C. A. in their work in many mining towns. These consist chiefly of reading-rooms and classes, with the added attraction of bowling, billiards, ball and tennis grounds, swimming pools, etc. We must admit that these are not so numerous at the present time, although I agree we are headed in the right direction regarding them. Now, we must not forget that most of these diversions are purely American sports and games, and naturally do not appeal to the foreigner. Again, we are too prone to regard foreigners as a class by themselves, and are not giving them an even chance to learn and become interested in our games. In our contact with these people we should forget nationality and encourage them to join with us in the enjoyment of the attractions and diversions offered. Are we doing this?

While speaking of the Y. M. C. A. diversions, first-aid teams, prize gardens and other uplifting agencies, I am reminded forcibly of the reference made to the power of music, in "Extracts from a Superintendent's Diary," *Coal Age*, Aug. 28, p. 337. This superintendent tells us of the universal appeal that music possesses, its all-pervading power and charm and the deep motion it is able to arouse in the human breast. That short article is worth the reading to anyone. In describing the effect of a song, he states: "Old grudges seemed to be forgotten, neighborhood quarrels seemed to have lost their meaning and distinctions of birth and salary meant nothing at all to the crowd while under the spell of the music." The crowd to which he refers was composed of the men, women and children of the camp, and the singing was that of a young lady visitor possessed of a "magnificent voice."

In closing, permit me to mention another reference made by George N. Lantz, Aug. 21, p. 309, who suggests: "Every community should have its local band or officer, while choral clubs and good quartettes always provide a source of profitable entertainment." In my own experience good musicians are plentiful in all mining camps, and these can be organized at little expense to give free concerts and provide good singing in places where the miners could bring their families for an evening's enjoyment. The Welsh and Germans long ago realized the value and power of music in their mining towns, and if we gave this matter the attention it deserves we would be surprised at the amount of such talent existing in our mining towns and ready at all times when asked to give their best efforts for the common good.

C. J. FUETTER.

Logan, W. Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

The Circumference—The circumference of a circle is divided arbitrarily into 360 deg., which probably originated as corresponding closely to the number of days in a year, or the ratio of the number of revolutions of the earth on its axis to a single cycle in its orbit. The number 360 is also a convenient number for subdivision.

The Quadrant—The quadrant is a fourth of a circle. Two diameters perpendicular to each other divide the circle into four quadrants, each containing a right angle and subtending an arc of 90 deg. in the circumference of the circle.

Radius, Chord and Tangent—A **chord** of a circle is perpendicular to the radius passing through its middle point.

A **tangent** is perpendicular to the radius at its point of tangency to the circle.

The **chord of an arc** of a circle is a mean proportional between the diameter of the circle and the rise of twice that arc.

The **half-chord** of a circle divides the diameter to which it is perpendicular into two parts or segments and is a mean proportional between them.

To Find the Center of a Circle—Draw two chords making a suitable angle with each other. Bisect each of these chords with a perpendicular. The center of the circle is determined by the intersection of the two perpendiculars.

Inscribed Angles—An angle is inscribed in a circle when its apex lies in the circumference and the lines forming the angle are chords, or one of the lines may be the diameter of the circle. Thus, in Fig. 2, on the preceding page, the angle ABC is inscribed in the circle whose center is O. Likewise, in Fig. 1, the angle BAC is an inscribed angle; also, the angle ABC and ACB.

An angle inscribed in a circle is measured by one-half of the subtending arc, and is therefore equal to one-half of the corresponding central angle, which is measured by the same arc. Thus, in Fig. 2, the inscribed angle ABC is exactly one-half of the central angle AOC, each being subtended by the same arc AC.

Any angle inscribed in a semicircle, as the angle ABC in Fig. 1, is a right angle, being measured by one-half of the semicircumference ADC or ½ of 180 deg. = 90 deg.

Inscribed Polygons—A polygon is inscribed in a circle when all of its angles are inscribed angles and its sides are chords of the circle. Since the perimeter of a regular polygon of a given number of sides is proportional to the radius of its circumscribing circle, and its area to the square of that radius, the side and area of regular polygons can be expressed as multiples of the circumscribing radius and its square respectively as given below:

No. of Sides	Subtending Angle	Length of Side	Area of Polygon
3	120°	1.732 R	1.299 R^2
4	90°	1.414 R	2.000 R^2
5	72°	1.176 R	2.378 R^2
6	60°	1.000 R	2.598 R^2
8	45°	0.765 R	2.828 R^2
10	36°	0.618 R	2.939 R^2
12	30°	0.518 R	3.000 R^2

The Coal Age Pocket Book

PRACTICAL PROBLEMS

Given the Chord and Rise of a Circular Arc—

1. To find the Radius: Divide the square of half the chord by the rise, and to the quotient add the rise and divide the sum by two; or, expressed as a formula,

Radius of arc, $$r = \tfrac{1}{2}\left(\frac{c^2}{4\,h} + h\right) \quad (1)$$

2. To Fnd the Length of the Arc: The best method is to apply the principle of subchords, by first finding the rise of the arc for each successive subchord, in turn, using the formula,

Rise of subchord, $$h_1 = r\,(1 - \sqrt{1 - h/2r}) \quad (2)$$

until a rise is found (h_n) that gives practically the same value as before for the total length of arc as calculated by the formula

Length of arc, $$l = 2\,n\,\sqrt{h_n\,(2r - h_n)} \quad (3)$$

3. To Find the Area of the Sector Subtended by the Arc: Multiply the length of the arc by one-half the radius; thus,

Area of sector, $$A = \frac{l\,r}{2} \quad (4)$$

4. To Find the Area of the Segment: From the area of the sector subtract the area of the triangle formed by the chord and the two radii drawn to its extremities, as expressed by the formula

Area of segment, $$A = \tfrac{1}{2}\,[l\,r - c\,(r - h)] \quad (5)$$

Given the Chord and Radius of a Circular Arc—

1. To Find the Rise: Subtract the square of the half-chord from the square of the radius; extract the square root of the remainder and take the root thus found from the radius; or, expressed as a formula,

Rise of arc, $$h = r - \sqrt{r^2 - (c/2)^2} \quad (6)$$

2. To Find the Length of the Arc: First find the rise of the arc by means of Formula 6; then follow the method described above, applying Formulas 2 and 3.

3. The areas of the sector and segment are then found as previously explained.

Given the Rise and Radius of a Circular Arc—

1. To Find the Chord: Subtract the rise of the arc from twice its radius; multiply the remainder by the rise; extract the square root of the quotient and multiply by 2, as expressed by the formula

Chord of arc, $$c = 2\,\sqrt{h\,(2r - h)} \quad (7)$$

2. To Find the Length of the Arc: Apply Formulas 2 and 3, as previously explained.

3. The areas of the sector and segment are found as before.

Note—The above formulas, 1-7, give the closest approximation possible in the solution of circular arcs, sectors and segments, without the use of trigonometric functions.

Inquiries of General Interest

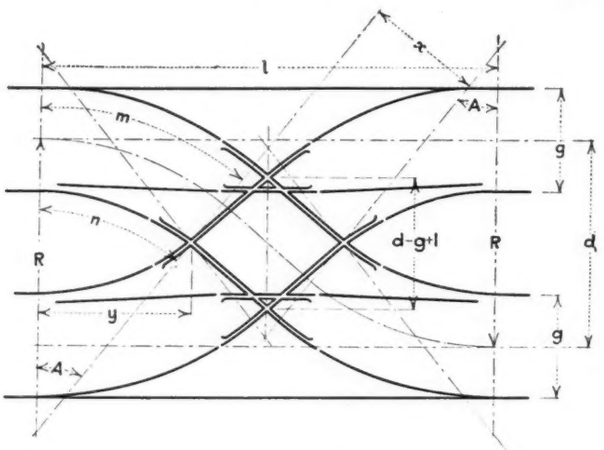
Calculating Diamond Crossover for Shaft Bottom

We want to put in a diamond crossover at the bottom of our shaft, and I would like to ask if it is possible to put in such a crossover with four frogs. There are two parallel tracks, each having a gage of 42 in., and the distance between the inner rails of these tracks is also 42 in. I would very much appreciate a sketch showing how this can be done and the position of the frogs and giving the other dimensions necessary to lay out the crossover.

ALVIS P. MERCER.

Martwick, Ky.

The only dimensions given in this case are the gage of the track (g = 3.5 ft.) and the distance between track centers, which is twice the gage, or $d = 2 \times 3.5 = 7$ ft. In order that such a crossover can be operated successfully, it is necessary that the two frogs on the straight rails of the two tracks shall be constructed, as shown in the accompanying figure, with a small triangle



A DIAMOND CROSSOVER

of solid iron in the center of the frog. The purpose of this is to sufficiently separate the three points where the gage lines of the three rails cross each other. It will be sufficient if the gage lines of the two switch rails cross each other 6 in. inside of the gage line of the straight rail. This will make the distance measured straight across the rails, between the two points where the gage lines of the switch rails cross each other, $d - g + 1$, as indicated in the figure. All the dimensions in the following calculation are made to gage lines.

The first step in the solution is to find the angle A, which subtends the curved rail of each of these switches. This angle is found by substituting the values for d and g in the formula

$$Cos\ A = \frac{g}{d - g + 1} \times \frac{3.5}{7 - 3.5 + 1} = \frac{3.5}{4.5} = 0.7778+$$

Hence, $A = 38° 57'$.

The second step in the solution is to assume a convenient radius, say in this case R = 10 ft., and calculate therefrom the entire length of the crossover, from point of switch to point of switch, which is marked l in the figure. This distance is found by applying the principles of trigonometry, which gives the formula

$$l = 2\ R\ sin\ A + \frac{d - 2\ R\ (1 - cos\ A)}{tan\ A}$$

Then, substituting the known values in this formula, gives for the total length of the crossover

$$l = 2 \times 10 \times 0.6286 + \frac{7 - 2 \times 10\ (1 - 0.7778)}{0.8083}$$

$$= 15.73\ ft.$$

Since the angle of curvature of each of the switch rails is 38° 57′ and the radius of the outer rail in each switch is $r_1 = R + \frac{1}{2}g = 10 + \frac{1}{2}(3.5) = 11.75$ ft., the length of the outer curved rail, indicated by m in the figure, is

$$m = \frac{38° 57'}{180°} \pi r_1 = \frac{38.95}{180}\ (3.1416 \times 11.75) = say\ 8\ ft.$$

The radius of the inner curved rail is $r_2 = 10 - \frac{1}{2}(3.5) = 8.25$ ft., and the length of this inner rail, indicated by n in the figure, is therefore

$$n = \frac{38.95}{180}\ (3.1416 \times 8.25) = 5.6\ ft.$$

The length of straight rail in the switches, indicated by x in the figure, is found by substituting the known values in the formula

$$x = \frac{l - 2\ R\ sin\ A}{cos\ A} = \frac{15.73 - 2 \times 10 \times 0.6286}{0.7778}$$

$$= 4.06\ ft.$$

The two frogs in the loaded and empty tracks respectively are located midway between the switches, or at a distance of $\frac{1}{2}l$ from either switch. It now remains to calculate the distance of the two frog-points lying between the tracks, or the distance marked y in the figure. This distance is measured on the line midway between and parallel to the two tracks, from the line joining the switches to the point of frog. This distance is calculated by substituting the known values in the formula

$$y = \sqrt{r_2\ (d - g) - \tfrac{1}{4}\ (d - g)^2}$$

Since the radius of the inner curved rail (r_2) is 8.25 ft., the frog distance at each end of the switch is

$$y = \sqrt{8.25\ (7 - 3.5) - \tfrac{1}{4}\ (7 - 3.5)^2} = 5.08\ ft.$$

It is possible to lengthen out this crossover by adopting a longer radius than R = 10 ft. The angle of curvature (A), however, remains constant, for the same values of distance between track centers (d) and track gage (g), as appears from the formula given for finding this angle. For example, for a radius R = 15, the length of this crossover would be l = 19.27 ft. It is also possible to have the crossover rails cross each other outside of the track rails instead of arranging to have them cross within these rails, as in the foregoing figure.

Examination Questions

Tennessee Examination for Mine Foremen, Etc.

(Continued from Last Issue)

Ques.—A certain entry generates more or less marsh gas in many of its working places, sometimes in considerable quantities. This entry is worked with naked lights and kept reasonably clear of gas by means of a good ventilating current, which is carried well into the faces by frequent breakthroughs and the use of line brattices where necessary. A foreman, while making his rounds during the day and starting up this entry, finds the main door standing open and all the air short-circuited from the entry. He does not know how long the door has been open or what the conditions are at the face, except that a small number of men are working that day in this entry. Explain what he should do under these circumstances, giving reasons. How would you criticize the management of this mine?

Ans.—Since the foreman does not know how long the door has been standing open, or the quantity of gas that may have accumulated in the workings in the meantime, it would be dangerous for him to close the door and thus reëstablish the current in the entry. This would at once drive any gas that may have accumulated in certain places onto the open lights of the miners at work. It may be assumed that the miners have not experienced any serious trouble as yet owing to the door being opened. The foreman should therefore proceed with caution up the entry, leaving the door standing open. He should carry a safety lamp or, not having this, he should extinguish his own light and proceed in darkness. (All mine officials should carry a small flashlight for such emergencies as this.) If possible, he should leave someone to guard the entrance until his return. Having reached the men at work, the only safe method to adopt would be to order all lamps extinguished and withdraw the men from the entry temporarily until the place can be examined for gas in the usual manner with a safety lamp and pronounced safe for work. After the men have been withdrawn from the entry and before the door is closed, all the men working on the return of that current should be notified and likewise withdrawn. The door should then be closed and every entrance to that section of the mine and the return airway carefully guarded.

The setting open of a door in a mine does not necessarily call for the criticism of the management, further than to say that all doors should be so hung that they will close automatically unless they are propped or held open. If the door was propped open so that it could not close, this would call for an investigation that would place the responsibility on the guilty party.

Ques.—A miner on going back to a hole that he supposed had failed is injured by the explosion. He is badly burned on the face and arms and has his right leg broken above the knee. The doctor is out of the camp and it is impossible to obtain medical assistance for several hours. You have a first-aid outfit at the mine as required by the mining law. Describe in detail what you would do for this man while waiting for the doctor.

Ans.—As quickly as possible bring a stretcher and first-aid outfit, including splints and bandages, to the place. In the meantime, avoiding any unnecessary movement, place the injured man in as comfortable a position as you can. Having put him on the stretcher and carried him to the nearest convenient place where there is good air, proceed to bind a long splint reaching from the foot to the armpit on the outside of the injured leg, together with a shorter splint reaching from the foot to the crotch on the inside of the leg. The binding strips should encircle the chest as well as the limb, in order to prevent unnecessary movements of the fractured bone.

Apply a thin paste made with water and baking soda, starch or flour to the burned surfaces. Vaseline, olive or castor oil, fresh lard or cream may be used to keep the air from contact with the burn. Cover the burned parts with a light bandage to exclude air and dust.

Ques.—In a small drift mine in which one of the openings for air is the drift, while the other is a shaft through the hill and connected with the air course, the top of the shaft is about 100 ft. above the level of the seam. (a) Relying on natural ventilation, tell how and why the air will circulate. (b) Will there be any difference in the direction of the air current at different times of the year, and if so, in what direction will the air travel in the winter and in the summer seasons respectively?

Ans.—In a drift mine the seam may be assumed to be practically level. The air in the mine airways is supporting two air columns of equal height, but of unequal temperature, during the greater portion of the year, in that portion of these columns corresponding to the depth of the shaft. The two air columns have equal temperatures above the level of the top of the shaft, and it is unnecessary to consider them above that level, as their pressures balance each other.

(a) The air column in the shaft, however, does not always balance the corresponding 100 ft. of atmospheric column at the drift mouth, because of the shaft temperature being generally higher or lower than that of the outside air and the weight of the shaft column therefore being usually less or greater than that of the outside air column. As a consequence the air in the mine airways moves from the point of higher pressure to that of lower pressure.

(b) Yes. In the winter season the outside temperature being lower than that of the mine, the outside air column 100 ft. high is heavier than the shaft column, and this excess in weight causes the unit of ventilating pressure that forces the air to move from the drift mouth toward and up the shaft. In the summer the reverse is true—the mine temperature being then lower than that of the outside air, the shaft column is the heavier of the two columns, and the air moves down the shaft and out the drift mouth.

Book Reviews

Resuscitation, Manual and Mechanical

REPORT OF THE COMMITTEE ON RESUSCITATION FROM MINE GASES—By W. B. Cannon, George W. Crile, Joseph Erlanger, Yandell Henderson and S. T. Meltzer. United States Bureau of Mines, Technical Paper 77. Paper cover; 5⅞x9⅛ in.; 33 pp.; 4 ill. Free on application.

Some time ago "Coal Age" urged the Bureau of Mines to have its researches into subjects indirectly related to mining made by specialists as competent as those engaged to investigate mining problems and said that engineers ought not be chosen when sociological appointments had to be filled. Whether the Bureau took the advice thus proffered or not cannot easily be determined, but in any event when it decided to investigate resuscitation it chose out a formidable body of recognized experts to make the inquiries and a report. Yet "Coal Age" cannot consider itself impressed by the result.

In fact, the bureau itself, while publishing the monograph in full, added a preface in which it somewhat openly ignored the resuscitation device recommended by one of the committee and urged the Schaefer system of artificial breathing, just as if the Meltzer apparatus were, for some reason, impracticable. It must be confessed that this report, while at times quite interesting, is on the whole of doubtful value and does not appear quite fair.

MERIT OF OCCASIONAL RIB BREAKING

One of the principal recommendations does, it is true, meet with almost universal approval. The authors of the report advocate the use of the Schaefer instead of the Silvester treatment, and the public is by this time fully in accord with that judgment. But one reason given for that verdict is ridiculous. One of the advantages claimed in the report for the prone pressure method over the Silvester is that there is little danger of injuring the liver or breaking the ribs if pressure be gradually, not roughly, applied. Whoever suggested that the Silvester method had that defect? Why, then, claim the Schaefer is superior because with care it may not have it?

The Schaefer treatment has been credited with that defect many times, but here the fault is urged as a surpassing merit. Dr. Lauffler has declared that the system of resuscitation could only injure a patient whose bones were severely tuberculosed. Let us not be misunderstood. Probably the Schaefer method is as harmless as the experts assert, but to suggest that it is to be preferred to the Silvester method because, with proper care, it will not do what the Silvester method never can do is a queer process of reasoning. Such an argument is akin to that of declaring that a felon is better than an honest man because, while the honest man never committed a crime, the felon only did it when severely tempted. But perhaps it is not well to find fault with those who agree with us on the main issues, even when the reasons for their agreement are a cause of much regret.

One good reason for preferring the Schaefer method is given in our issue of Aug. 30, 1913, in an editorial on "The Schaefer Method." This argument in behalf of prone pressure has been too generally overlooked. The Silvester method employs parts of the body which are more likely to be burned or broken in an accident and therefore, to use a medical phrase, "is seldom indicated." The Schaefer method involves parts which the first-aid man usually finds entirely uninjured. It is therefore usually to be preferred.

WHEN FIDO HAS A FAINT DON'T GET A PULMOTOR

The part of the report which has caused no little excitement is that relating to the pulmotor, and it is probably proved that this insufflating device is ill-fitted for the resuscitation of chloroformed pussycats and anaesthetized and curarized lap dogs. A better system of supplying these animals with air in apnoea appears to have been devised long ago. It is to be hoped that all mine managers will remember this when Fido has a faint and will refrain from sending for a pulmotor.

It is interesting to note that, according to the report, the pulmotor more or less proves inadequate when used on animals. But Dr. Meltzer has found that another insufflation apparatus which had proved successful on dogs, cats, rabbits and monkeys failed to work on men, doubtless, however, not for the same reason as makes the pulmotor less valuable for small animals than for human beings. But that modifications are needed in the one case makes it only fair to admit that they may be required in the other.

Dr. Meltzer and his associates will doubtless assent to this, but as they do not make it plain it is well to assert it. Everyone knows that experimentation on one mammal is not a sure guide to the way in which another mammal will react to like treatment. It is frequently indicative, of course, and valuable, but it is by no means conclusive.

The committee seems to show unjustifiable bias in dealing with the pulmotor. The layman will hardly sympathize with the feeling of the profession so clearly manifested in the statement, "The pulmotor has received wide publicity in the daily press," and again, "Its loudest sponsors are the newspapers." The medical man has trained himself to feel as if by instinct that what the public praises is by that sign anathema. The reason for the doctors failing to praise the pulmotor, though many have approved it, is the same which restrains the technical press in general. The pulmotor is a proprietary article, and therefore anything written in its favor sounds like an advertisement. Moreover the doctors do not like to praise what doctors do not invent or introduce.

The report attempts to show that neither in Germany nor in the United States has the pulmotor been given much attention by the medical press and profession. It quotes several cases in which the pulmotor has been said to do good work, and then inquires either whether the persons really needed any help or not and whether some other means might not have done as well. To show how grossly unfair the insinuations are, one will be quoted.

IS THERE ANY CONCEIVABLE WAY BY WHICH A SKEPTIC CAN BE CONVINCED?

"Dr. Rossiter, company surgeon, Swissvale, Penn., reports a case of 'gassing' Dec. 28, 1912: The patient was unconscious, had no pulse, no signs of respiration, very feeble heart and loss of all reflexes. Before I arrived the hospital attendant performed artificial respiration in connection with the inhaling device of the pulmotor. I continued this treatment after my arrival for about one-half hour, at the end of which time there was very little change in the patient. I then switched over the pulmotor and adjusted it without pulling out the tongue or pressing on the larynx. In the course of a few minutes the patient started to fight and wanted to sit up."

The patient had been given manual artificial respiration by a hospital attendant, the doctor had continued the treatment for a half hour, and in addition he had permitted the patient to inhale oxygen and all the work done had just enabled the patient to keep life in his body. What does the committee say?

"In this case manual artificial respiration combined with oxygen continued the respiratory function for much longer than the critical period and the pulmotor was not necessary."

If then the victim of an explosion in your mine can be kept hovering between life and death by the expert use of manual movements and inhalation of oxygen, do not use a pulmotor—for he might get up and walk, and some foolish man in your employ might credit the pulmotor with doing the work. But the argument is so weak "Coal Age" may be excused if it quotes another gem—this time about some Bureau of Mines' cases:

"In the eighth case (Burgess) the pulmotor was first applied 30 min. after the victim had been removed from the gas atmosphere. No statement is made as to what was done for him in the interim. In the ninth case (Enzian) Dr. McGuire, of Wilkes-Barre, 'endeavored for two hours to revive her by artificial respiration. Failing in this a pulmotor was brought a distance of 8 miles. Under the manipulation of G. T. Holdaman the patient was revived in two or three hours.' Cases 8 and 9, in which the victims lived a long time before the application of the pulmotor (half an hour and two hours), do not present convincing evidence."

According to this method of proof a remedy which appeared to break up a chronic disease would be subject to more doubt than one which seemed to cure a passing ailment. And one which cures a passing ailment is not a cure because the ailment would cure itself in any event. Hence all remedies are vain.

We remember a much-discussed story about a woman who had an "issue of blood" for many years and had wasted her substance in going from doctor to doctor. She was healed by a miracle. We have often heard this event discussed. Some have denied the cure was miraculous; some have said it was psycho-physiologic; others have imagined some occult technique of which the record reports nothing. But had our five wise inquisitors been asked, we presume they would have said that the woman had lived so long it is likely she would have continued to live to a ripe old age, and in fact she was bound to get suddenly well at the precise moment when the alleged miracle occurred.

IS THE PULMOTOR TOO AUTOMATIC IN ACTION?

Three complaints are made against the pulmotor. One is its automatic activity taken in connection with the ease by which inspiration is turned in expiration. This can be corrected by the hand if necessary as the investigators admit. In fact, the insufflator recommended will not work in any other way. The objection is most obvious in the lower animals where the resistances are greater. The committee acknowledges that there may be differences between lower animals and men saying, "In lower animals, certainly, the blast often meets obstacles in passing from the larynx into the alveoli, and the inspiratory pressure of the automatic pulmotor is in many cases insufficient to overcome them."

A second complaint is that it effects expiration by suction. Reliance is largely placed on experiments with lower animals to prove that such suction is dangerous to lungs, bronchi and alveoli, and as we have said, such evidence is at least questionable. However, the committee quotes the experience of Dr. Morris Fishbein, who reported " a case in which a patient had been poisoned with carbon monoxide and was subjected to the action of the pulmotor for several hours. After nearly five days of unconsciousness the patient died. At the autopsy hemorrhage into the lungs and visceral pleura were found, together with subpleural emphysema (dilated areas) of the right lung, and the question was raised whether these pathological conditions did not result from the use of the pulmotor."

DID IT INJURE LUNGS, BRONCHI AND ALVEOLI?

But perhaps it would be pardonable to quote Dr. Fishbein at some length, which the committee fails to do. Under the heading, "Anatomic Diagnosis," referring to the patient, who was a colored adult, he says the following conditions were found: "Hemorrhage into the lungs and visceral pleura, subpleural emphysema of the right lung (following the use of the pulmotor?) engorgement of the pial vessels, edema and petechial hemorrhages in the lining of the small bowel, petechial hemorrhages in the lining of the greater antrum of the stomach and in the lining of the duodenum distal to the ampulla of Vater, hyperemia of the kidneys, small hemorrhages and slight edema of the lining of the base of the bladder" and 15 other adverse conditions.

All the lesions above given have reference to escape or engorgement of blood or its purple mottlings of the surface except emphysema, which refers to the presence of gas in the serum. So it is clear that for some reason the whole blood of this negro was affected, whether by the action of the pulmotor, by the withdrawal of 12 oz. of blood followed by intravenous transfusion of saline solution by the drop method practically continuously for five days, or by reason of the changes which took place after the patient died. It is to be noted that the committee failed to mention the other methods of resuscitation which the doctors at the Cook County Hospital adopted and said nothing about the work of the undertaker.

The reader will note that the date of the autopsy was not given by Fishbein, so the committee appears not to have been in position to tell whether the hemorrhages and emphysema were not rather due to changes after death than to the unusually extended use of the pulmotor. But they passed over this possibility and over those sequent on intravenous transfusion, illuminating gas absorption and the care of the undertaker. Delafield and Prudden in their "Handbook of Pathological Anatomy and Histology" well say, "It is the novice in postmortem examinations who is particularly apt to mistake postmortem alteration for significant lesions."

EVIDENCES THAT HEMORRHAGES MAY BE DUE TO ILLUMINATING GAS

The bulletin quoted refers to Robert S. Combes' article, "Clinical Manifestations of Illuminating-Gas Poisoning," and states that he probably has had no experience with the pulmotor because he says, "Reports from all over the country relative to its efficiency have been received." Consequently his testimony based on 1000 cases of gas poisoning will be all the more acceptable. If he says certain conditions exist and he has not used the pulmotor, then the lesions are not the results of the use of that instrument. If on the other hand he has used it, his testimony in its favor is not to be discounted by the committee.

He says: "At postmortem examinations the organs are deeply injected (swollen with blood), especially the spleen. There may be scattered small hemorrhages and at times cerebral changes, particularly areas of softening in the lenticular nucleus, symmetrical in many cases." Under the "Sequels" of gas poisoning he lists cases of broncho-pneumonia. Is it possible that these instances are really cases of emphysema of the lungs?

Dr. McCombes also says, but the bulletin fails to quote him, that the prompt suction by the pulmotor of the carbon monoxide present in the residual air and that which is constantly eliminated from the blood materially aids resuscitation. He adds that the pulmotor has made the necessity for venesection and introduction of normal salt solution less frequent. As he is referring to gas poisoning he does not refer to the power of the pulmotor to remove water from the respiratory organs, a further quality in its favor.

After all, if the pulmotor is a device which can save life it is not to be condemned even if it is proved that after several hours of action on a patient hopelessly poisoned it produces both hemorrhage and emphysema. They are not such dreaded afflictions. Many a man near death has been saved at the cost of a leg or an arm. But there appears no reason to believe the action of the pulmotor is of the character suggested even when infants are subjected to its kindly ministration.

ARE NOT ALL INSUFFLATORS APT TO CHARGE AND DISCHARGE THE STOMACH?

There is left the third charge that the entrance of air into and the escape of air from the stomach may cause movements that simulate respiration, although no air enters or leaves the lungs. The same is true of the Meltzer insufflator when the belt and compress or the weights on the stomach are removed. It is probably an excellent practice to deflate the stomach in the use of a mechanical breathing apparatus.

Some points which the authors regard as minor are, however, true and ponderable. The pulmotor does not supply pure oxygen; it is heavy and expensive and may, though of this we are not sure, waste much oxygen. They might also add that the instrument is complicated and contains much rubber which may get out of condition. But the report seems unfair in its conclusions and should be revised. It advocates a form of insufflator which has apparently been praised by no one but the committee and has apparently never been used. Not even newspapers are its sponsors, and the Bureau of Mines even hesitated to give it its indorsement in the preface.

A First-Aid Manual

VEST-POCKET FIRST-AID BOOKLET. By Daniel E. Sable, M. D., Assistant Gynecologist to the South Side Hospital, Pittsburgh, Penn., and Police and Fire Surgeon, Department of Public Safety, Pittsburgh, Penn. 104 pp.; 3¼x5⅝ in.; 64 illustrations. National First-Aid Publishing Co., Nixon Building, Pittsburgh, Penn. Price, 50c.

This is a good little book, but not so lengthy as that published by the American Red Cross, and not so complete. It is much more handy than the Johnson & Johnson blue book, for it will slip into a vest-pocket without much violence. Its briefness is not in illustration but in comment, and the pictures tell their story better than a lot of text.

In his preface the author says he has avoided long words. He tells about an intelligent workman, tears furrowing his grimy face, who stood fumbling a bulky old-fashioned first-aid volume. "Why can't they use plain English?" he commented bitterly. Then the author adds: "That is exactly what I have attempted to do." Nevertheless, the reviewer was surprised to find on the first text page, despite the preface, some expressions he didn't know, to wit: asphyxia algida, asphyxia carbonica, and another expression no one ever saw before—asphyxia neonatarium (neonatorum, surely).

The doctors must be allowed their frailty, and this medico nearly all through the book certainly does avoid using long words and talks plain hard sense to the general public. In fact, it seems sometimes as if, like Uncle Dick, in one of Dickens' novels, he kept a page like page 7 on which to spread himself when the current of words caught him foul. He seems to be extremely practical despite his lapses, which are infrequent. But he wants us to use carron oil. It is alleged that Dr. Halberstadt is proud that the corks of the carron-oil bottles, which an ancient law compels him to keep, cannot be drawn and his belief in the mussiness and detestibleness of that offensive mixture is shared by almost the whole profession.

The little volume is handy and inexpensive and has been translated into German, Italian and Slavish.

Coal and Coke News

Harrisburg, Penn.

The counties included in each of the eight districts into which the state has been divided for the administration of the Workmen's Compensation Act have been announced by the Compensation Board.

The referees are to be appointed by Nov. 15 and two of them will be located in the Philadelphia district and two in the Pittsburgh district. One referee will be located in each of the other six interior districts.

Harrisburg, Reading, Scranton, Williamsport, Altoona and Erie are the headquarters for referees outside of the Philadelphia and Pittsburgh districts.

District No. 1 includes Philadelphia, Delaware, Chester, Montgomery and Bucks counties. The two referees of this district will have headquarters in Philadelphia.

District No. 2 includes Berks, Schuylkill, Lehigh, Northampton and Carbon counties. Headquarters of the referee to be at Reading.

District No. 3 includes Montour, Columbia, Luzerne, Monroe, Pike, Wayne, Lackawanna, Susquehanna and Wyoming counties. Headquarters of referee will be at Scranton.

District No. 4 includes Dauphin, Lebanon, Lancaster, York, Adams, Franklin, Cumberland and Perry counties. The headquarters of the referee will be at Harrisburg.

District No. 5 includes Tioga, Lycoming, Bradford, Sullivan, Union, Snyder, Centre, Clinton, Cameron, Potter and Northumberland counties. The headquarters of the referee will be at Williamsport.

District No. 6 includes Cambria, Blair, Huntingdon, Mifflin, Juniata, Fulton, Bedford and Somerset counties. The headquarters of the referee will be at Altoona.

District No. 7 includes Erie, Warren, McKean, Elk, Forest, Venango, Mercer and Crawford counties. The headquarters of the referee will be at Erie.

District No. 8 includes Lawrence, Butler, Clarion, Jefferson, Indiana, Armstrong, Westmoreland, Fayette, Greene, Washington, Beaver, and Allegheny counties. The headquarters of the two referees will be at Pittsburgh.

It is pointed out by members of the State Insurance Board that of all the methods of compensation liability insurance permitted employers in Pennsylvania, insurance in the state fund alone gives complete protection from personal liability and from the filing of liens on the employer's real property which may very probably hinder, if not prevent, its sale or its use as security for the borrowing of money.

Every other form of insurance leaves the employer personally liable, every agreement or award of compensation may be entered as a lien against his land and cannot be discharged until the whole compensation agreed upon, or awarded has been paid in full, which may not be for 8 or 10 years.

On the other hand, a subscriber to the state fund, by giving to the Department of Labor and Industry the same notice of an injury to an employee which he is now by law required to give relieves himself from all personal liability. The state fund immediately assumes all his obligations and no claims against him can become a lien or cloud on his property, real or personal.

In addition, the act creating the state fund makes a sufficient appropriation to pay all expenses. This, with the entire absence of agents' and brokers' commissions enables the state fund to give this complete protection practically at cost.

PENNSYLVANIA

Anthracite

Kingston—Judge Moser, of Sunbury has been assigned to hear arguments in the case of the Kingston Coal Co. against the Plymouth Coal Co., in which the former company claims the latter should keep its fans and pumps in operation in the Dodson colliery. The Dodson colliery has been abandoned and the Gaylord colliery of the Kingston Coal Co. is affected because an opening had been made in the barrier pillars.

Lansford—To further combat the progress of the fire that has for years been destroying coal, the Lehigh Coal & Navigation Co. is now engaged in laying a line of pipe to carry the great volume of water from the No. 8 tunnel and thus pour it into burning coal deposit.

Eleven miners employed in the Foster tunnel of the Lehigh Coal & Navigation Co., at Coaldale, were entombed shortly before noon, Sept. 27, by a sudden rush of water breaking through the roof from an abandoned working. Two of the 11 men were rescued alive and in good condition, Sept. 28, while officials of the company have hopes of getting out alive others of the men still imprisoned. While it is believed that none of these miners have been crushed under the fall, it is possible that some of them may have been drowned.

Jeddo—The Union Improvement Co., a corporation which leased coal tracts in Hazle and Foster Township to the G. B. Markle Coal Co., under certain mining conditions on a coal royalty basis has filed equity proceedings against the latter company and asks an accounting and a payment of royalties in excess of what has been offered. The leases were made in 1890 and extend for a period of 30 years. A clause in the leases provided an increased royalty for coal sizes larger than pea taken from the Mammoth and Wharton veins.

Shamokin—Recently a falling stack at the boiler-house of the Corbin colliery struck three men, instantly killing one and seriously injuring two others.

Bituminous

Connellsville—Production and shipments of Connellsville coke are about equal and stationary at 390,000 tons per week. It is stated that while there is no actual shortage of coke cars, there is no longer a surplus, and the railroads are requiring operators to move all cars on the tracks promptly.

Pittsburgh—It is estimated that the Pittsburgh district is short 15,000 men, and there is slight hope of making good this deficiency. Coal cars are in demand and some of the railroads have notified companies not to expect much above 60 per cent. of their normal supply. Traffic in coal continues to increase steadily.

Uniontown—Persistent reports here are to the effect that the W. J. Rainey Co. is to transfer its force of accountants and auditors from New York to the Uniontown offices and make the general offices of the interests in this city. It is reported on reliable authority that the Rainey company is negotiating for a tract in a recently opened residential section of the city on which it is proposed to erect 20 brick dwelling houses for these employees.

Recent advances in the price of coke have temporarily put an end to a movement on the part of prominent coke producers to bring before the Interstate Commerce Commission the conditions of this region as to rates on bituminous coal as compared with the Pittsburgh and Greensburg-Latrobe districts. Competition with these districts in the coal trade, according to the local operators, is impossible with the alleged discriminatory rates now in force. The movement was well defined a few weeks ago when a committee of three appointed at a meeting of merchant coke operators conferred with Philadelphia officials of the Pennsylvania R.R. The meeting came to naught and the coke men considered taking their complaint to the Commission but recent advances in the price of coke have caused the coal trade proposition to be temporarily abandoned. Quiet influences are still at work to center the sentiment of the coke operators in order that a concerted appeal may be made at some future time.

Star Junction—Twenty-one ovens have been fired at the Murphy plant of the Echard Coal & Coke Co. and more will be fired by the end of the next week.

WEST VIRGINIA

Mullins—It is the current belief that the Virginian railroad will soon extend passenger service from Mullins to Elmore, a distance of about 15 mi. This new branch extends through a rich coal section.

Fairmont—More than 40,000 copies of the mining law of West Virginia, as amended by the last Legislature, have been received by the secretary of the Central West Virginia Coal Operators' Association for distribution among the miners employed by the coal companies operating in the central part of the state. The pamphlets are printed in seven languages, English, Russian, Hungarian, Polish, Italian, German and Slavonian.

The mining plant of the Four States Coal and Coke Co., which has been closed since the first of August, will be started at once, and within 10 days 500 miners will be working. The continued improvement in the coal business is the reason for resuming operations. The plant has been in the hands of a receiver for some time, but it is assured now that it can be operated at a profit.

Charleston—A class of 170 miners recently took the examination for mine foremen and fire bosses. It is said that this is the finest class of miners ever examined, and that the majority of the men showed the necessary qualifications for the position to which they aspire.

Holden—Mine safety car No. 8 of the U. S. Bureau of Mines will arrive at Holden, Oct. 2, for the purpose of giving demonstrations in mine rescue and first-aid work. The car will remain here until Oct. 14, during which period lectures will be given relating to rescue work. From here the car will go to Omar, W. Va., to remain until Oct. 27, after which it will proceed to Ethel, W. Va., remaining there until Nov. 9.

KENTUCKY

Middlesboro—The next quarterly meeting of the Southern Appalachian Coal Operators' Association will be held in this city on Oct. 22, this being the first time in the history of the organization that a meeting has been held outside of Knoxville. The reason for the change is that it is hoped more operators will attend, Middlesboro being nearer the center of the territory.

In addition to a car shortage which is affecting the operations in this territory it is stated that a labor shortage, to be charged in part to restriction of foreign immigration during the last year or more, will be noted before the winter is over.

Whitesburg—It is stated here that the mines of the Elk Horn Mining Corporation at Hemphill on Yount's Fork will resume in full shortly, giving employment to from 200 to 300 men. These mines have been idle since last November, although the company's plants in Fleming and Haymond have been running full time for several months turning out a large output.

Some coal operators of the eastern Kentucky field complain of a car shortage along the Louisville & Nashville R.R. which is affecting, somewhat, the mining activity, although operators insist that business is fairly good. Prospects look encouraging also for the business in the future, and the railroads promise to remedy the car shortage.

OHIO

Columbus—Statistics are being compiled by the Ohio Industrial Commission showing the average yearly earnings of coal miners in the state. This work is being carried on by Fred C. Croxton, chief statistician who is compiling figures on all of the employees of the state.

ILLINOIS

Millstadt—The Lippert Bros. Coal Co., recently organized, has opened a mine half a mile southeast of Millstadt. The shaft is 40 ft. deep. The Buxton & Miller Coal Co. has reopened an old drift mine one mile south of Edgemont, which will be known as the Buxton mine.

Belleville—The International Coal Co. has electrified its mine by installing a fan motor and electric mining machines and a substation containing one 150-kw. 250-volt 525-ampere generator, driven by a 220-hp. motor, power for which is furnished by the Southern Light & Power Co. The Superior Coal Co. has installed electric motor haulage consisting of one 8-ton mine motor, a 75-kw. 250-volt 525-ampere generator, driven by a 150-hp. motor, power for which is furnished by the Suburban Railroad Co.

The fifth annual report of Thomas C. Wright, inspector of mines for St. Clair County, shows that there are 69 mines in the county, against 71 last year, and that of these 17 are not being operated, against 15 last year. The total output for the year ending June 30, 1915, was 3,017,820, against 4,117,002 last year. Of the 52 mines in operation 36 were shipping and 16 were local operations. Five men were killed in mine accidents in the county during the year and 36 were so badly injured as to be disabled 30 days or more. The company which hoisted the most coal from one mine was the St. Louis & O'Fallon Coal Co., with a total output of 643,615 tons. The Consolidated Coal Co. hoisted 468,730 tons from one mine The Taylor Coal Co. hoisted 295,319 tons from two mines, the Southern Coal, Coke & Mining Co., 144,386 tons from one mine and the Suburban Coal & Mining Co. 127,780 tons from one mine.

Harrisburg—Reduction of the salaries of superintendents, assistant superintendents and bosses at the O'Gara mine No. 9 came near precipitating a strike of those functionaries recently. These men however finally decided to accept the reduced salaries and keep their jobs.

Springfield—It has been found advisable to postpone the examination for the office of chief clerk of the mining board until Nov. 6 in order that wider publicity might be given and a greater number of applications secured.

IOWA

Des Moines—James Finney, coal miner, who lost an eye in a mine accident at Bussey, Ia., has informed the Iowa Industrial Commission that he will claim compensation for complete disability under the workmen's compensation act. Finney had but one good eye when he went to work for the coal company. The question to be submitted to arbitration is whether the employer can be compelled to pay a workman for total disability when he loses his second eye.

The Keystone mine, operated by the Keystone Coal Co., has resumed operations after a shut down of 4 days to correct conditions complained of by the mine inspectors.

Centerville—An examination for mine foreman and hoisting engineers will be held at Centerville on Oct. 5 and 6. Candidates for these certificates will be required to answer satisfactorily 12 written and 8 oral questions.

NORTH DAKOTA

Wilton—The mine of the Washburne Lignite Coal Co. is busy as orders from all over the state have been received in considerable abundance, and shipping is at the rate of between 25 and 30 cars per day. Since the new coal rate has gone into effect, the local plant has been obliged to put on more men in order to supply the trade. With prospects of an early fall and severe winter, this mine is preparing for the biggest year in its history.

COLORADO

Trinidad—Naturalization schools for adult coal-mine workers will be organized at a conference to be called here October 11. Mary C. C. Bradford, state superintendent of public instruction, the superintendents of schools in Huerfano and Las Animas counties and the sociological department of the Colorado Fuel & Iron Co. will then convene and visit the leading southern Colorado coal camps with the object of deciding the best means of accomplishing desired results.

PERSONALS

F. L. Garrison, sales agent of the Pittsburgh-Westmoreland Coal Co. at Buffalo, N. Y., has resigned his position to go into other business.

E. J. Conroy, formerly sales agent for Castner, Curran & Bullitt, has been appointed resident manager for C. C. Corey, at Grand Rapids, Mich.

William Jay Turner was on Sept. 25 appointed general counsel of the Lehigh Coal and Navigation Co., in the place of Samuel Dickson, deceased.

James B. Mahon and D. D. Hull were recently elected directors of the Virginia Coal & Coke Co. to succeed B. P. Learned, and Henry K. McHarg.

Wm. J. Turner has been elected general solicitor for the Lehigh Coal & Navigation Co., filling the position made vacant by the death of the late Samuel Dickson.

S. D. Forbes, in recent years sales manager of the New England Coal & Coke Co., is now manager of sales for S. P. Burton & Co., Boston, New England representatives of the Crozer-Pocahontas Company.

F. F. Morris recently returned from the German office of the Draeger Oxygen Apparatus Co. to Pittsburgh, and is prepared to proceed with the manufacture of helmets and other oxygen apparatus in this country.

F. R. Wadleigh sailed from New York on Sept. 29 for the purpose of investigating coal markets in France, Spain and Italy in particular, and is not expected to return until December. Mr. Wadleigh is representing some large American coal interests.

W. E. Hardy, for the past 11 years connected with the Diamond Rubber Co. and the B. F. Goodrich Co., being lately in charge of the sales department of the mechanical rubber-goods division, has been appointed sales manager for the Boston Belting Co., of Boston, Mass.

Secretary B. F. Nigh, of the Michigan-Ohio-Indiana Coal Association, reports quite an increase in the membership of the association since the annual convention held at Cedar Point in June. In the last 60 days more than 40 new members have been added to the rolls. In the same period the

association has collected more than $800 freight claims against railroads for its members.

John Harding, identified with the Connellsville coke industry for a number of years has assumed the superintendency of the Garwood plant of the Aetna Connellsville Coal & Coke Co. He succeeds C. L. Patterson. Mr. Harding's home is in Uniontown, Penn., where he has successively been employed by the H. C. Frick Coke Co. and several independent concerns. He was lately in business for himself.

Clarence J. Hicks, formerly with the International Harvester Co. and for many years prominent in Y. M. C. A. work, has been appointed executive assistant to J. F. Welborn, president of the Colorado Fuel & Iron Co. Mr. Hicks in addition to his general duties as full assistant to Mr. Welborn, will have charge of the social service and general betterment work which the company has lately instituted.

John S. Johnson, for a number of years outside superintendent for the Lehigh Coal & Navigation Co., has been appointed inspector of construction work for the Hudson Coal Co. Mr. Johnson, whose duties will be the superintending of repairs to breakers and construction of all descriptions around them, will work under the direction of Eli T. Conner, chief consulting engineer of the Hudson Coal Company.

Vice-President Charles O'Neill, of District No. 2 bituminous field, of the United Mine Workers of America, recently stated that this district was 10,000 miners short of the usual working forces as a result of the European war and the demand for men in steel and allied industries. Thousands of men have gone to Europe to join the armies of their respective countries. With only a normal demand for coal this winter, it is stated, there will be a decided labor famine.

TRADE CATALOGS

The Stevens Co., Pittsburgh, Penn. "Modern Mine Cars." Illustrated, 8 pp., 6x9 in.

Lea-Courtenay Co., Newark, N. J. "Centrifugal Pumps." Illustrated, 64 pp., 6x9 in.

Morse Chain Co., Ithaca, N. Y. "A Chain of Evidence." Illustrated, 20 pp., 6x9 in.

Skinner Engine Co., Erie, Penn. "The Universal Unaflow." Illustrated, 28 pp., 8½x11 in.

Badger Fire Extinguisher Co., Boston, Mass. "Neglect = Ashes." Illustrated, 16 pp., 3½x6 in.

The Carnegie Steel Co., Pittsburgh, Penn. "Structural Beams." Illustrated, 12 pp., 5x7½ in.

D. & W. Fuse Co., Providence, R. I. "There Are Reasons for This." Illustrated, 16 pp., 3½x6 in.

Betson Plastic Fire Brick Co., Rome, N. Y. "Betson Plastic Fire Brick." Illustrated, 20 pp., 4x9 in.

Badger Fire Extinguisher Co., Boston, Mass. "Badger Fire Extinguisher." Illustrated, 16 pp., 3½x6 in.

Atlas Preservative Company of America, New York. "Atlas 'A' Wood Preservative." Illustrated, 16 pp., 4x8 in.

Badger Fire Extinguisher Co., Boston, Mass. Badger 40-Gallon Chemical Engines." Illustrated, 6 pp., 5½x7 in.

Badger Fire Extinguisher Co., Boston, Mass. "Badger Chemical Fire Engine." Illustrated, 4 pp., 5½x7¼ in.

The Stow Manufacturing Co., Binghamton, N. Y. "Portable Tools of Proven Value." Illustrated, 20 pp., 3½x6 in.

Western Electric Co., New York. "Mine Telephone Systems and How to Install Them." Illustrated, 41 pp., 7½x4½ in.

Joseph Dixon Crucible Co., Jersey City, N. J. "The Use and Abuse of Ball and Roller Bearings." Illustrated, 20 pp., 6x9 in.

Robert A. Keasbey Co., New York. "Carey System of Insulation for Underground Steam Pipes." Illustrated, 4 pp., 7x12 in.

Standard Underground Cable Co., Pittsburgh, Penn. "Pointers on Telephone Cable Specifications." Illustrated, 31 pp., 3½x6 in.

The Atlas Preservative Company of America, New York. "Stationary service, Atlas 'E' Boiler Preservative." Illustrated, 24 pp., 4x8 in.

Robert A. Keasbey Co., New York. "Insulate Underground Pipes in This Easy and Permanent Manner." Folder, 6 pp., 3½x6 in. Illustrated.

PUBLICATIONS RECEIVED

Department of the Interior, Bureau of Mines. Miner's Circular 18. "Notes on Miner's Carbide Lamps," by James W. Paul. Unillustrated, 11 pp., 6x9 in.

Department of the Interior, Bureau of Mines. Thechnical Paper 110. "Monazite, Thorium and Mesothorium," by Karl L. Kidhil. Unillustrated, 32 pp., 6x9 in.

Department of the Interior, Bureau of Mines, Technical Paper 83. "The Buying and Selling of Ores and Metallurgical Products," by Charles H. Bolton. Unillustrated, 53 pp., 6x9 in.

Department of the Interior, Bureau of Mines. "Monthly Statements of Coal Mine Fatalities in the United States, June, 1915." Compiled by Albert H. Fay. Unillustrated, 15 pp., 6x9 in.

Department of the Interior, Bureau of Mines. Bulletin 75. "Rules and Regulations of Metal Mines," by W. R. Ingalls, James Douglass, J. R. Finley, J. Parke Channing and John Hays Hammond. Unillustrated, 296 pp., 6x9 in.

Department of the Interior, Bureau of Mines. "United States Mining Statutes, Annotated," by J. W. Thompson. Bulletin 94, Part 1, Sections and Statutes Relating to Metaliferous and Coal Mining." Unillustrated, 860 pp., 6x9 in.

Department of the Interior, Bureau of Mines. Technical Paper 109. "Composition of the Natural Gas Used in 25 Cities with a Discussion of the Properties of Natural Gas," by G. A. Burrell and A. G. Oberfell. Unillustrated, 26 pp., 6x9 in.

INDUSTRIAL NEWS

Buffalo, N. Y.—The John K. Kerr, Inc., Coal Co., lately organized, has opened an office at 39 Erie St. Mr. Kerr is president and general manager.

Muskogee, Okla.—The Oklahoma Consolidated Coal Co. has been incorporated with a capital stock of $500,000. The incorporators are R. T. Price, E. A. Jennings, and E R .Jones, all of Muskogee.

Terre Haute, Ind.—The Interstate Mining Co. has been incorporated here, with $5,000 capital stock, to do a mining business. The directors are F. G. Fisbeck, I. H. Woolley and George H. Richards.

Powhatan, W. Va.—It is announced by the management of the Powhatan Coal & Coke Co., of Powhatan, W. Va., that the company will construct a tipple at a cost of $45,000 to replace the one which burned recently.

Denver, Colo.—Rumors that the James J. Hill interests were negotiating for the Rockefeller holdings in the Colorado Fuel & Iron Co. have been denied. Hill personally refused to discuss the matter but his secretary denied the entire report.

Huntington, W. Va.—The Chesapeake & Ohio R.R., it is believed, will load more coal in 25 days in September than it did in 26 in August. Several circumstances combine to make coal prospects brighter than they have been before in many years.

Lex, W. Va.—The Rocky Branch Pocahontas Coal Co. was recently organized with a capital of $5,000. The incorporators are H. J. Brooke, Edythe Brooke, and J. A. Thorn, of Welch, W. Va., and Archibald Shimmin, and D. R. Hopkins, of Bluefield, W. Va.

Hartshorne, Okla.—The McAlester Colliery Co. of Hartshorne has just been incorporated with a capital stock of $50,000. Incorporators are: S. L. Moreley, Oklahoma City; H. P. Rivers and W. J. Hulsey, of Hartshorne. The company will operate mines near McAlester.

Grafton, W. Va.—It is stated that the labor question is rapidly growing more and more serious in this region. It is stated by some authorities that the coal business in West Virginia cannot be materially increased at present owing to the fact that no more laborers can be secured.

Crewe, Va.—The Wilson-Berger Coal Co. has been incorporated with a maximum capital stock of $350,000, and a minimum of $50,000. The incorporators are C. E. Wilson, president, Crewe, Va.; William H. Mann, and W. H. Mann, Jr., of Richmond, Va.; P. C. Berger, of Chatteroy, W. Va.

Baltimore, Md.—At a recent meeting of the board of directors of the Baltimore & Ohio R.R., authority was voted for the construction of a coal-pier at the Curtis Bay terminal at Baltimore. This will have an estimated capacity of 10,000,000 tons per year, and will cost approximately $1,500,000.

Clarksburg, W. Va.—The Central Fairmont Coal Co. recently closed a yearly contract with a railroad for the latter's entire requirements of coal, and is now employing about 100 additional miners. This firm has also purchased additional live stock for the purpose of meeting the increased production.

Charleston, W. Va.—The Island Creek Coal Co., a corporation of the State of Maine, was recently admitted to do business in the State of West Virginia. The capital stock is $250 000, while the assessed valuation of the property owned by the company in the state is over $2,300,000, most of which lies in Logan Copnty.

Carterville, Ill.—William E. Trautmann of East St. Louis, receiver for the Carterville Coal Co., Carterville, Ill., has filed a petition with the United States District Court for permission to sell the mines of the company. The mines, under ordinary conditions, are estimated to be worth $150,000. The indebtedness of the company is $85,000.

Louisville, Ky.—Articles of incorporation have been filed here by the Nashville Mining Co. with a capital of $11,000 and a debt limit fixed at $25,000. The company proposes to operate mines and leases, hold, buy and sell coal, clay and other mineral lands. G. W. Hardin, B. H. Farnsley and Clarence Dallam are the incorporators.

Huntington, W. Va.—Default having been made on the payment of bonds of the Branchland Coal Co., issued in 1907, the Equitable Trust Co. of New York, has advertised the property situated in Logan County for sale on Wednesday, Oct. 20. The bonds are for $150,000, while the estimated value of the property is between $250,000 and $300,000.

Pottsville, Penn.—The Eastern Pennsylvania Coal Co., of Middleport, Schuylkill County, has been finally adjudged by the U. S. District Court at Philadelphia as an involuntary bankrupt. The company was formed to operate an abandoned working near here, but the enterprise did not meet with success, as it was found too costly to mine the coal.

Huntington, W. Va.—A 60-mile extension of the Virginian R.R. is now in process of construction. This railroad will run from Mullen through Pineville, Winden, Baileysville, and along the Guyan Valley through Gilbert in Mingo County to Mann in Logan County. All the rights of way have been secured, and forces are engaged in grading preparatory to the laying of rails.

Baltimore, Md.—Announcement was recently made here to the effect that the Alabama Co., the successor to the old Alabama Consolidated Coal & Iron Co., has just closed a deal for the sale of approximately 400 acres of its coal lands, located in the Birmingham district of Alabama. The price which the purchasers paid for the property was in the neighborhood of $80,000.

Whitesburg, Ky.—C. A. McIntyre, B. P. Young and others are negotiating for the purchase of a large tract of coal and timber land above here on the Louisville & Nashville R.R. in the Elkhorn coal field of Letcher County. In the event of the deal being completed work of development such as the opening of mines, grade work, the building of miners' houses, etc., will be started immediately.

Huntington, W. Va.—The Pond Fork Ry. Co. was recently incorporated with a capital stock of $26,000 for the purpose of constructing and operating a railroad from Madison, Boone County, up the Pond Fork of Coal River to the head waters of Pond Fork, a distance of about 25 miles. The incorporators are R. M. Baker, Herbert Fitzpatrick, J. A. Hagen, Jr., George Garred, and F. B. Enslow, of Huntington, W. Va.

Artemus, Ky.—The Jackson Coal Mining Co. has taken over the operations formerly conducted in the name of the Dean Coal Co., near Artemus. The main office of the new company is in Knoxville, Tenn., in charge of A. B. Day, of the Sanford-Day Iron Works, as president, and D. H. Jenkins, of the Proctor Coal Co., as secretary. The operations will be in charge of W. B. Kinder, superintendent, at Artemus.

Columbus, Ohio—The Ohio Coal Washing and By-Products Co. has been incorporated with a capital of $50,000 to erect and operate a coal washery at some location in the Hocking Valley. The location is to be fixed at a later date. The incorporators are William Job, E. E. Hazelton, E. E. Learned, Arthur F. Ayers and H. L. Sibley. The leader in the movement, William Job, is well known in coal circles in the Buckeye state.

Cincinnati, Ohio—The Kellioka Coal & Coke Co. has filed in the United States Circuit Court of Appeals its appeal asking the reversal of a judgment of the Federal Court in Kentucky, under which it was adjudged to be the holder of a fraudulent deed to several hundred acres of coal land in Harlan County, Ky., valued at $20,000. Z. B. Brock, the former owner of the land, claimed that he had been induced to part with title for an inadequate consideration.

Pineville, Ky.—The Creech Coal Co., with Robert Creech as president and general manager, capitalized at $200,000, has just been incorporated. The Banner Fork Coal Co., with W. J. Cunningham as president and L. P. Johnson as secretary and treasurer, has been incorporated with a capital of $100,000. Both of these companies contemplate operations on the recently extended branch of the Louisville & Nashville R.R. up Wallins Creek in Harlan County.

Louisville, Ky.—Bondholders of the Consolidated Coal Co., owning and operating mining properties in eastern Kentucky, are said virtually to have agreed to a proposition whereby they are to receive half the interest on their bonds during the next two years, with the understanding that the other half due them is to accumulate for payment at such times in the future as the company's finances will justify settlement in full. The company has outstanding a little less than $3,000,000 in bonds.

Philadelphia, Penn.—All the large shippers of coal in this territory have been notified by the various railroads of the car shortage which is becoming more serious as the season advances. Recently the Baltimore & Ohio began to place the operators in this district on the percentage basis, and the same company has issued a letter to all large shippers urging that they use care in making shipments and in addition to do all in their power to release cars at unloading points as promptly as possible.

Hickman, Ill.—The Nashville, Chattanooga & St. Louis R.R. Co. has announced that it will not take advantage of a ruling of the Interstate Commerce Commission allowing it to charge $1.50 per ton on all coal delivered to Hickman. The rate announced is $1.35. The old rate was $1.20. An attempt was made by the company to put the $1.50 rate into effect, but appeals were made to the Commission and the matter was held up for several months. The railroad company finally announced the $1.35 rate.

Charleston, W. Va.—The Kanawha Coal Shippers' Association is contemplating arrangements designed to meet the situation which will arise in case the proposed increase of 15c. in the rate from West Virginia coal fields to Western points is adopted. The plan as tentatively settled upon provides for the establishment of big storage and distribution centers at Marietta, Portsmouth and Cincinnati, Ohio, Huntington and Pt. Pleasant, W. Va., and Evansville, Ind., to which coal will be sent by river from various West Virginia river points at which loading plants will be erected.

Philadelphia, Penn.—Nothing has stirred the coal operators in the West Virginia fields recently as has the request of the four trunk-line roads in the state applying to the Interstate Commerce Commission for permission to advance the rates on bituminous coal 15c. per ton. As a consequence of this action by the railroads the prominent producing interests held a meeting in this city recently to map out a course of action to combat that of the railroads. The operators contend that to allow such an increase will badly cripple the coal business of the entire state, together with all other industrial enterprise closely allied with it.

Pittsburgh, Penn.—The Westinghouse Electric & Mfg. Co. has been awarded a number of prizes and medals at the Panama-Pacific International Exposition. Among these was a gold medal for the most complete and attractive installation in the palace of transportation. Gold medals were also received on a number of different classes of apparatus, among which are steam turbines, alternating- and direct-current generators, alternating- and direct-current railway motors, transformers, rectifiers, starting, lighting and ignition systems, switchboards and accessories, and mining locomotives. A grand prize was also received on a 4,000-hp., 650-volt, direct-current, double-unit Pennsylvania electric locomotive.

Philadelphia, Penn.—Contrary to opinion expressed at the time the railroads obtained a delay of two months before the enforcement of the new anthracite rates as ordered by the interstate commerce commission, it now appears likely that the companies will ask for a rehearing of the entire case. When the postponement to Dec. 1 was asked for it was stated that the delay was made to permit the railroads to check their tariffs in order to find any errors or discrepancies in the new rates. It is alleged that the companies will base their reason for a new trial on the fact that not a single member of the interstate commerce commission personally heard the testimony. In the beginning Commissioner Marble sat for two days, when he was taken ill and died. After that the testimony was completed by an examiner and the decision of the commission was founded on the information elicited by him.

Coal Trade Reviews

General Review

Cold snap stimulates the anthracite trade. Bituminous stiffer but not particularly active. Further advance in vessel rates checks exports. Car supply becoming the predominating feature at interior points.

Anthracite—The return of lower temperatures has precipitated a general buying movement and the new month has opened with anthracite fairly active. Orders are becoming urgent and indications point to a consistent improvement from now on. The frequent predicitions of the summer months, that consumers were failing to stock, have been fully sustained by the heavy buying developed by the first appearance of cold weather. In retail circles, however, there is still considerable competition, which continues to force some low prices in spite of the fact that wholesalers are showing a stiffening tendency as regards quotations. Steam sizes are particularly strong. The possibility of labor difficulties next April is also coming in for more consideration as the season advances, and it is noted that manufacturers are here and there laying by a few cars of coal of steam sizes against a possible future emergency.

Bituminous—The return of more seasonable weather has created a better feeling in bituminous and the market is appreciably stiffer, though not particularly active. It is noted that the railroads continue stocking operations and the larger manufacturers are being influenced to do likewise. Consumers are demanding close to the maximum tonnages on contracts, and occasional requests for urgent shipments are even being received. Buyers are showing a disposition to cover their requirements, but operators are not inclined to consider business ahead at the prevailing low figures. Some of the better grades are already practically out of the market and uncertainties in the car and labor supply are now definite factors in the situation.

Exports—Scarcity of vessels and a larger internal consumption have created a momentary relapse in the foreign business, but inquiry continues very persistent and there is every reason to anticipate a heavy demand through the balance of the season. The foreign trade is still largely predominated by the freight market, which has advanced still further, under the influence of a heavier demand for grain vessels. Tonnage is very scarce even at the new high level. Coastwise rates have not changed materially, but there is a notable absence of sailing vessels, most of the latter now being engaged in the off-shore business.

Lake Markets—The growing car scarcity is gradually looming up as the predominating feature in the coal markets. Nearly all districts are beginning to feel the pinch, and shippers are generally declining orders where special equipment of any kind is specified. Lake shipments are somewhat heavier than a month ago, but it is gradually developing that the closing period of navigation will not experience such a rush as was anticipated. The August shipments from the Upper Lake ports to interior points show a substantial increase over July, but the gross movement for the season to date is slightly behind last year, and there is only a little storage room available, this being held for some special grades.

Middle West—Noticeably cooler weather with frost in some localities has started coal moving into the consumers' bins, while dealers are giving greater consideration to their stocks, and the situation is generally active on the domestic grades. Buying is being resumed on a broad scale and there is little cheap coal offered. A definite car shortage at this time, some mines losing one and two days per week, is causing noticeable anxiety as to the outlook later when the winter trade gets under way. The railroads are still absorbing a heavy tonnage for stocking purposes, while there is a good movement of Illinois coals into the Northwest, all rail. Business in this direction is growing steadily and showing indications of a strong, persistent demand throughout the balance of the season.

A Year Ago—Domestic grades of anthracite in strong demand, but steam sizes are heavy. Bituminous still slowing down though prices are well maintained. Industrial demand suffering from generally adverse conditions.

BUSINESS OPINIONS

Iron Age—Signs of increasing home consumption are plainer as the steel trade enters the last quarter of the year. The upward trend of prices is, if anything, more marked, and inquiry for rolled steel for the first quarter of next year is broadening. The problem of the bar mills in making deliveries on home contracts, and at the same time meeting the demands for war steel, is growing more difficult. A Cleveland company closed this week with the Lackawanna Steel Co. for 35,000 tons of bars, deliveries extending over twenty months. New orders for shell steel are coming out constantly. Additional requirements for France that will come to the mills when the present French contracts are finished in February amount to 300,000 tons.

American Wool and Cotton Reporter—The wool market is still quiet, but has a firm undertone. The lifting of the British import on crossbreds, it is felt, will make the American market unsteady to a certain extent and may tend to lower the prices of medium wool, although the depressing influence will be only temporary. All indications point toward further advanced prices for wool. These will take place, it is thought, on each big buying movement.

Philadelphia News Bureau—The completion of the Anglo-French loan is the important feature of the moment. This settles a most difficult problem. The joint note offered is probably the strongest foreign note that could be offered. The victory of the allies in the western front has added strength to the loan. But besides the loan, the beginning of the heavy crop movement and the strong position of the banks help. Sterling exchange should gradually advance more to the normal and yet the import point of exchange will be much below the old-established basis. The tendency of sterling is bound to be downward because of the fact that our exports of merchandise is to be so largely in excess of our current imports.

Dun—Commercial enterprise responds to the stimulus of lower temperatures, which accelerate a broader distribution of fall wearing apparel and other merchandise. Industrial operations, notably in iron and steel and allied lines, continue apace and full employment of labor, in a number of instances at advanced wages, materially enhances the purchasing power of the people. Savings bank deposits, drawn down during the late period of depression, are again accumulating, and practically unlimited financial resources are available for facilitating the return of national prosperity.

Bradstreet—Trade currents are running more freely than heretofore; remaining obstacles to progress are passing; growth is of the cumulative type; sections somewhat pessimistic a while ago are now taking a brighter view of the future, and international political and financial matters apparently have assumed more pleasant aspects. Three forces loom large in the week's expansion—cold weather, higher prices for cotton and foreign orders for munitions of war.

Southern Lumberman—The steadily improving outlook which has been noted in the yellow pine market for the last four weeks or more has now begun to be converted into actual business, and prospects for greater improvement are better than at any time in months. Reports received this week from the producing territory of the South and from distributing markets of the Middle West are uniformly optimistic, and show more business done and at better prices than during any recent week. Actual fall trade has now begun in the hardwood market. This is shown by better demand from furniture manufacturers, by continued call from the railroads and car shops, and heavier buying by automobile and implement factories than has characterized the market for several weeks.

Marshall Field & Co.—Current wholesale distribution of dry goods has been more satisfactory than for some time past. Orders received daily have shown a material increase consistent with the more seasonable weather. The total number of buyers in the market this week was considerably more than a year ago. Collections have been good, and shipments of merchandise considerably ahead.

ATLANTIC SEABOARD

BOSTON

Slow improvement in Pocahontas and New River. Railroads stock up more than usual but no like move among manufacturers.. Water freights continue the same and anthracite is steady after a dull September.

Bituminous—Now that the weather is more seasonable there is a renewed optimism over fall trade in Pocahontas and New River. Progress, however, is very slow. Coal is in ample supply at all the Hampton Roads piers, but the slow movement of boats coastwise is partly responsible for the accumulations. Export inquiry is fairly constant and there is apparently every reason to count on an active demand from this quarter the balance of the season. A shortage of equipment on the coal roads is beginning to be talked in this territory but buyers here are seldom interested in such predictions until prices actually begin to move up.

Some of the New England railroads are stocking up to a greater extent than usual and this is expected later to influence some of the larger manufacturers to do the same. Receipts on contract are now only about normal, but if conditions are good it is expected they will increase as the month goes on.

Georges Creek is coming forward in about normal volume. The shippers are now fairly well caught up on contracts and have spot coal available in limited quantities on about the contract range of price.

Sales agents for the Pennsylvania grades are already canvassing with a view to next senson's business. In some cases prices are being named subject to advances in the mining scale and in tolls to tidewater. Should there be a greater advance in tolls on the railroads from West Virginia than from the Pennsylvania districts there would probably be a largely increased opening for the Pennsylvania grades.

Water Freights show no material change; 75@80c. is the prevailing rate on 2,500 tons upward, Hampton Roads to Boston, but there is still a dearth of sailing vessels. Most of the latter are still engaged in off-shore business.

Anthracite—September was a very disappointing month for retailers. As a result, the fall trade will be rushed the latter part of October and in November when dealers least need orders. As it happened, the warm spell coincided with the fog along the coast, and most of the companies are still reasonably well supplied with orders. At the same time there is no difficulty about securing any sizes the customer requires.

Bituminous quotations, f.o.b. loading ports at points designated, are about as follows per long ton:

	Philadelphia	New York	Baltimore	F.O.B. Mines
Clearfields	$2.15@2.65	$2.45@2.95	.....	$0.90@1.40
Cambrias and Somersets	2.40@2.90	2.70@3.20	.....	1.15@1.65
Georges Creek	2.92@3.02	3.22@3.32	$2.85@2.95	1.67@1.77

Pocahontas and New River prices on cars at Boston are $3.55@3.73, Providence,$3.50@3.68, and f.o.b. loading port at Hampton Roads, $2.80@2.85.

NEW YORK

Anthracite situation improves. Demand better and prices for individual coals stronger. Better feeling in soft-coal market. Car and labor situation serious. Contract holders taking full quotas.

Anthracite—The anthracite market shows improvement. Lower temperatures caused a better demand and independent operators are receiving higher prices than for some weeks past. Demand from the West continues brisk and consumers are being urged to stock up while transportation conditions continue favorable. The companies continue to store large quantities of all sizes, particularly the smaller buckwheat coals.

Individual coals are now within about twenty cents of the companies' circular. Nut coal seems to be the only one of the prepared sizes causing any trouble to shippers. Demand for pea and No. 1 buckwheat remains about the same. Nos. 2 and 3 are shorter. Considerable of these coals are being stored by the operators in anticipation of winter demands. The next week or ten days will, however, see a big change in the steam-coal situation, owing to the heat being turned on in the big office buildings.

The line trade shows much improvement. Demand from New England is notably better. Mine prices are as a rule a trifle stronger than at tidewater. Shippers complain of the scarcity of small cars and operators are beginning to feel the effects of labor shortage.

Current quotations at tidewater, per gross ton, f.o.b., are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$5.05		$5.10	
Egg	5.30	$5.00@5.30	5.35	$5.10@5.35
Stove	5.30	5.00@5.30	5.35	5.10@5.35
Chestnut	5.55	5.00@5.55	5.60	5.10@5.60
Pea	3.50	3.25@3.50	3.55	3.50@3.55
Buckwheat	2.75	2.25@2.75	2.80	2.25@2.80
Rice	2.25	1.85@2.25	2.30	2.00@2.30
Barley	1.75	1.50@1.75	1.80	1.75@1.80

Bituminous—There is a better feeling in the bituminous situation. Demand is stronger and there has been a general advance of from five to ten cents on nearly all grades. Dealers are encouraged but look for still greater changes for the better.

The question of cars is becoming serious and operators are now feeling the scarcity of labor more than ever before. New contracts are being entered into with some hesitancy because of these conditions.

Mine prices for line trade are in some instances, much stronger than for tidewater shipments. Consumers are taking everything possible on their contracts and some large manufacturers are wiring for prompt shipments. The local docks have no accumulation and the harbor is comparatively free of demurrage coals.

Shipments of export coal are being restricted by a shortage of bottoms. The demand contines heavy but the inability to close contracts for vessels is causing shippers to hold off.

Quotations on various grades, per gross ton, f.o.b. Tidewater, are as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.20@3.30	$3.20@3.30	$3.20@3.30	$1.75@1.85
Georges Creek Tyson	2.95@3.00	2.95@3.00	2.95@3.00	1.40@1.45
Clearfield:				
Medium	2.65@2.80	2.55@2.65	.....	1.10@1.25
Ordinary	2.55@2.60	2.55@2.60	.....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	.....	.....	1.35@1.50
Nanty Glo	2.75@2.80	.....	.....	1.20@1.25
Barnesboro	2.65@2.70	.....	.....	1.10@1.15
Somerset County:				
Quemahoning	.....	2.80@2.90	2.80@2.90	1.25@1.35
Medium	2.65@2.70	2.65@2.70	2.65@2.70	1.10@1.15
Latrobe	2.45@2.55	.....	.....	.90@1.00
Greensburg	2.75@2.80	.....	.....	1.10@1.15
Westmoreland	3.15@3.20	.....	.....	1.40@1.50
West Virginia Fairmont ¾		2.70@2.80	2.70@2.80	.90@1.10
Fairmont mine-run		2.60@2.70	2.60@2.70	.80@ .90
Steam		2.45@2.50	2.45@2.50	.90@ .95
Western Maryland		2.35@2.40	2.35@2.40	.85@ .90

PHILADELPHIA

Cold weather helps anthracite. Prices show indication of recovery, although cheap coal is still to be had. All steam sizes in fair demand, and some manufacturers begin to stock. Bituminous prices slightly higher. Export business quiet, but outlook is favorable.

Anthracite—The change in the weather has brought about the favorable conditions expected, but too late to prevent September being classed as a most unsatisfactory month. However, the closing days find orders coming into the operators at last. Retailers report that almost every order is urgent. This substantiates the contention that the cellars are practically empty and that the consumer would not buy until absolutely forced.

This week broken coal has been in strong demand and manufacturers who use this size are beginning to look to the future. Egg and stove are also in very fair demand and at good prices, while even chestnut shows indications of improvement. Of course this latter size is still quite low in price and the prospects are that it will not show any better figure so long as the circular price is so out of keeping with the other prepared sizes.

The steam sizes have very materially improved and seem to be in quite active demand as compared with last week. On special grades it has been impossible to fill the orders due partially to the fact that excessive flooding of the mines this summer resulted in a larger proportion than usual of the small sizes being used right at the colliery. The trade is also beginning to give more than passing attention to the suspension talk and have come to the conclusion that the demands of the miners are very liable to at least cause some unsettling of the business. For this reason a manufacturer here and there is putting a car or so of steam coal aside for an emergency.

While the prices on practically all sizes show a tendency to strengthen, that there is still cheap coal in the market, and it will take a month of real fall weather to eliminate it. Better prices are coming without a doubt, for even the individuals are now asking a higher figure for pea coal. At the present time $2 is the best price obtainable, although we note one instance where $2.25 has been obtained all summer for a special coal of this size.

The Western market for anthracite is now awake and has strengthened local conditions very materially.

That there is great faith in a good winter's business is demonstrated in a measure by the building of four large modern yards in the Germantown and Chestnut Hill section of the city. It has been many years since so much building activity has existed among coal dealers in one section of the city.

Quotations per gross ton, exclusive of the Pennsylvania state tax of 2½%, f.o.b. at mines and on vessels at the Port Richmond piers are:

	Line	Tide		Line	Tide
Broken	$3.50	$4.75	Pea	$2.50	$3.25
Egg	3.75	5.00	Buckwheat	1.25	2.25
Stove	4.00	5.00	Rice	.85	1.75
Chestnut	4.15	5.25	Barley	.50	1.50

Bituminous—Last week's gradual improvement continues, with the greatest demand being for the high volatile coals. The quiet recovery of the trade seems to be satisfactory to the shippers and the belief continues that we are on the verge of a good season and possibly an exceptional one. There has been some slight increase in prices and this gradual rise is expected to continue as the demand increases. Shippers are urging consumers to stock coal and in some instances their advice is being followed. No sales of large tonnage are reported, as operators are not inclined to commit themselves on large tonnages at prevailing prices, although tenders to this end are frequently made.

The prevailing prices for the week, per gross ton, are as follows:

Georges Creek Big Vein	$1.65@1.75	Fairmont gas, ¾	$1.20@1.30
South Fork Miller Vein	1.50@1.60	Fairmont gas, mine-run	1.05@1.15
Clearfield (ordinary)	1.10@1.20	Fairmont gas, slack	.70@ .80
Somerset (ordinary)	1.05@1.15	Fairmont lump, ordinary	.95@1.05
West Va. Freeport	.90@1.00	Fairmont mine-run	.85@ .90
		Fairmont slack	.60@ .70

BALTIMORE

Demand well sustained, car and labor shortage developing and prices slowly improving. Exports checked by lack of vessels.

Both labor and car supply grow more unsatisfactory and the price list is stiffening. Many mine interests are now complaining of a shortage of men. Operations are also restricted by the car shortage and orders are piling up. There is no longer any doubt that a decided stiffening to the market is under way.

The anthracite market is also improving. Nearly all dealers report an increasing demand now that cooler weather has set in. The demand so far centers largely on household sizes, and pea and nut coal are in especially good demand. An extremely busy fall is looked for as many householders who ordinarily have their supplies by this time failed to put in coal the past summer.

While there is now some little varience due to immediate necessities, prices per short ton to the trade at the mines and outside the Capes deliveries are:

	Mines	Balt.*		Mines	Balt.*
Geo. Crk. Big Vein	$1.75	$2.93	Fairmont		
Geo. Crk. Tyson	1.40	2.58	Ordinary mine run	$0.85	$2.28
Clearfield	1.25	2.43@2.48	Ordinary ¾	.95	2.38
South Fork	1.40	2.58	Ordinary slack	.65	2.08
Latrobe	.95	2.13	Low sulphur mine-run	1.10	2.53
Somerset (best)	1.35	2.53	Low sulphur ¾	1.25	2.68
Somerset (good)	1.20	2.38	Low sulphur slack	.75	2.18
Quemahoning	1.30	2.48@2.53	*F.O.B., outside Capes.		
Freeport	.85	2.03@2.08			
Miller Vein	1.10	2.28@2.33			

HAMPTON ROADS

Export shipments holding up well. Fair movement coastwise. Temporary accumulation at Tidewater.

Dumpings over the local piers have shown up well, especially to Italy and various South American countries, while the coastwise movement has been fair with cargoes to a large number of the New England ports and some shipments South.

The accumulation of coal on the railroad yards is perhaps somewhat in excess of normal and there may be some free coal. A number of the shippers, however, have a considerable quantity of vessel tonnage about due and with that now in port the beginning of the week will see a considerable reduction in the quantity now on hand. Prices are practically unchanged on the standard grades.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

Railroad	Week Ending Aug. 28	Sept. 4	Sept. 11	Sept. 18	Sept. 27
Norfolk & Western	211,639	232,394	156,459	182,047	163,400
Chesapeake & Ohio	103,472	82,485	93,260	87,680	91,341
Virginian	82,131	72,302	70,855	55,597	79,176
Totals	397,302	387,182	320,574	329,336	333,917

Ocean Charters, Clearances and Freights

VESSEL CLEARANCES

The following steamers have cleared during the week Sept. 17 to Sept. 24:

Vessel	Destination	Tons
NORFOLK		
Tasmania[1]	Spezia	4,432
Strathalbyn[1]	Dakar	6,666
Nordland[2]	Kingston	1,925
Capac[2]	Bahia Blanca	1,000
Achilles[3]	Cristobal	12,000
Genova[1]	Italian	5,261
Cleanthis[1]	Palermo	4,788
I. P. Justesen[4]	Buenos Aires	5,000
Luigi Ciampi[1]	Naples	5,000
Aldersgate[2]	Buenos Aires	5,050
Nina[5]	Maddalena	4,723
Selene[6]	Italy	5,050
Chipana[2]	Chilian	4,644
Doris[6]	Italy	5,293
Wegadesk[3]	Cristobal	6,500
Soerakrata[7]	Port Said	5,000
Bianchetto[1]	Genoa	2,469
Laertis[8]	Buenos Aires	6,039
Fert	Naples	7,900
F. Kreger	Lisbon	1,863
Jacksonville	St. Georges	961
Sverre	Valparaiso	5,353
NEWPORT NEWS		
Tottenham[9]	Port au Spain	4,600
Hermod[9]	Bridgetown	4,500
Caesar[10]	U. S. Government	3,200
Aspleyhall[9]	Naples	6,300
Veerhaven[11]	Montevideo	4,200
Strathspey[9]	Naples	3,800
Juan[9]	Cienfuegos	1,148
Birkhall[9]		6,300
PHILADELPHIA		
Moldegaard	Havana	1,788
R. Bohannon	Savannah	
Rio Blanco	Rio Janeiro	4,470
Northern	Marseilles	2,912
Annie Lord	Moncton, N. B.	450
S. H. Davidson	Bath	482
Modiva	Guantanamo	778

Vessel	Destination	Tons
PHILADELPHIA—Continued		
Falk[9]	Cardenas	
Eagle Hill[12]	Bangor	
Tohickon[12]	Newburyport	
Ontelaunee[12]	E. Boston	
Lincoln[12]	Marbelhead	
Ashland[12]	Boston	
Logan[12]	Providence	
Yemassee	Providence	
F. W. Munn[13]	Providence	
Powell[13]	Providence	
Oley[12]	Searsport	
Macungie[12]	Portland	
Pickering[12]	Bar Harbor	
Cumru[12]	E. Boston	
Neshaminy[12]	Brookline	
Moselem[12]	Newburyport	
Paxtang[12]	E. Cambridge	
Tabor[12]	Portsmouth	
Moline[12]	Phillipsdale	
Tulpehocken[12]	Milton	
Franklin[12]	Neponset	
Buck Ridge[12]	Everett	
Glendower[12]	E. Cambridge	
Good Spring[12]	Portsmouth	
Cocalico[12]	Portland	
BALTIMORE		
Mar Cor	Italy	4,500
C. Accame	Italy	6,198
Falk	Cuba	2,685
Argyle	Italy	5,463
Mediterraneo	Russia	3,464
Chasehill	Italy	5,500

[1] Pocahontas Fuel Co. [2] Castner Curran & Bullitt. [3] W. C. Atwater & Co. [4] C. G. Blake Co. [5] New River Coal Co. [6] Flat Top Fuel Co. [7] Smokeless Fuel Co. [8] Barber & Co., Inc. [9] Berwind White. [10] Md. Coal & Coke Co. [11] C. & O. Coal Agency Co. [12] Phila. & Reading C. & I. Co. [13] Sterling Coal Co.

OCEAN FREIGHTS

The freight market is stronger than a week ago, and steamers are in demand for grain at higher figures than recently paid. It is rumored that three steamers have been chartered for coals to the West Coast of Italy at $11.04, and but few steamers are offering, as the owners prefer grain at rates now obtainable, but occasionally there are boats willing to accept coal at less than market rates.

We quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$2.50@2.75	Bermuda	$3.00
Cardenas or Sagua	2.75@3.00	Vera Cruz	3.50@3.75
Cienfuegos	3.00@3.50	Tampico	3.50@3.75
Port au Spain, Trinidad	3.75	Rio	8.28@8.40
St. Lucia	3.50@3.75	Santos	8.40@8.64
St. Thomas	3.25@3.50	Montevideo	8.16
Barbados	3.75	Buenos Aires or La Plata	8.16@8.28
Kingston	2.75@3.25	Rosario	8.40
Curacao	3.25	West Coast of Italy	11.04
Santiago	2.75@3.25	Barcelona	10.32
Guantanamo	2.75@3.25	Valparaiso or Callao	7.25@7.50
Demerara	5.00@5.50	Marseilles	10.56

* Consignees paving dockage dues. ** Spanish dues for account. † Quotations on Plate coal by British steamers; neutral steamers are more difficult to obtain and the rates are always higher.

W. W. Battie & Co.'s Coal Trade Freight Report.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge. 24c. per net register ton per day demurrage."

OCEAN CHARTERS

The following charters have been reported from various sources during the past week:

Vessel	To	Tons	Rate
PHILADELPHIA			
F. Creadick	Cardenas	657	
Berlin	Havana	1,400	
Annie	Casilda	512	
W. H. Sumner	Cuba[1]	489	
F. M. Belding	Jacksonville	493	$1.05
A. B. Sherman	Charleston	510	1.10
Harry Morse	New Orleans		
BALTIMORE			
Grekland	Malmo[1]	1,671	
Biemiller	Point-a-Pitre[2]	858	$3.75
F. Palmer	San Juan	1,726	
C. F. Cressy	Boston	2,089	
Unbe Mendi[3]	Italy	2,664	
Mar Cor	Genoa	2,059	10.98
C. Accame	Genoa	2,504	

[1] South Shore.

Vessel	To	Tons	Rate
BALTIMORE—Continued			
Falk	Havana	1,125	
P. Maersk	Malmo		
Gothard	Havana	1,790	
Panama	Chili	2,915	
Mediterraneo	Barcelona	1,657	
Jupiter[3]	Italy	3,217	
Jean	Mayport	2,301	
VIRGINIA			
Kankakee	River Plate	2,418	
Nairn	Suez	2,324	
Umbe Mendi[1]	Italy	2,664	
Jupiter[1]	Italy	3,217	

[1] Gothenburg or Stockholm. [2] Or Phila. loading. [3] Or Baltimore.

LAKE MARKETS

PITTSBURGH

Definite car shortages appearing. Operations no heavier. Cooler weather. Lake shipments scarcely improved. Free coal steady with contract market a shade easier.

It is stated that not a single mine was able to operate on the Pan Handle division last Saturday, on account of there being no cars. While few of the mines have had orders sufficient to operate six days in the week the lack of cars proved a decided inconvenience. On nearly all divisions the supply is now scant and coal shippers attribute the scarcity to a decrease in the supply much more than to an increase in the coal shipments. Mining operations in the Pittsburgh district as a whole are at between 65 and 70% of capacity.

Cooler weather has given a slight impetus to the retail coal demand but the trade is still relatively quiet in this quarter. The iron and steel industry continues to consume a maximum supply of coal and is certain to be a very heavy consumer throughout the winter. The line demand generally is fair, while railroad consumption has increased. Lake shipments, while somewhat heavier than a month ago are still comparatively light and the rush in coal shipments expected for the closing period of the season is hardly likely to be experienced. The ore trade is now under such pressure that many boats are going up the Lakes light, in order to get in an extra ore cargo or two during the balance of the shipping season.

Prices for free coal retain their recently acquired firmness, but on contract to Apr. 1 the market is if anything a shade easier again, though not as low as a couple months ago. We quote for prompt shipment: Slack, 50@60c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1.05; ¾-in., $1.15; 1¼-in., $1.25. On contract to Apr. 1: Slack, 85@95c.; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

BUFFALO

No activity in anthracite and none expected till the weather is colder. Bituminous improves as the hot weather subsides. Prices quite strong. Fall trade promises to be good.

Bituminous—All reports agree that conditions grow steadily better. The demand is increasing and the car shortage is already making the consumer a trifle anxious and with the crops just beginning to move this may be increased soon. Certain mines that have been running four or five days a week are now preparing to go on full-time schedules. The Eastern demand is much better than it was, but there is no particular improvement in Canada.

Quotations on best grades, f.o.b. Buffalo, are:

	Pittsburgh	Allegheny Valley	Pennsylvania Smokeless
Lump	$2.65	$2.45	$2.55
Three-quarter	2.50	2.25	....
Mine-run	2.40	2.15	2.30
Slack	2.05	2.00	2.30

Quotations and freight rates to points east of Rochester, N. Y., and Kingston, Ont., are per long ton and balance of this territory is on the short-ton basis.

Anthracite—There is very little stir anywhere yet, though the trade feels that it must be near. It is the general opinion that there is less in consumers' hands now than has been the case in a long time and there is some eagerness to get started. There has been rather more coal sold by the independent companies than usual, but they have not failed to cut the circular price if necessary to do business. Concessions in this territory rule from 10 to 25c. off the circular, some being reported sold at April prices.

Quotations, f.o.b. cars at Buffalo, or in trestle to retailers, are $5.60 for lump, $5.85 for egg and stove, $6.10 for chestnut and $4.30 for pea, with 25c. additional for delivery on board vessel, all per gross ton of 2,240 lb.

TORONTO, CAN.

Industrial demand light and trade continues quiet.

Trade is quiet and featureless with ample supplies on hand. Manufacturing in nearly all lines continues inactive with little indication of any improvement for some time, though hopes are entertained that the good harvest may bring about a revival. Prices per short ton for best grades remain unchanged as follows: Retail, anthracite, egg, stove and nut, $7.75; grate, $7.50; pea, $6.50; bituminous, steam, $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $8. Wholesale, bituminous, f.o.b. cars at destination, three-quarter lump, $2.56; screenings, $3.

COLUMBUS

Warmer weather makes the coal trade quiet, especially in domestic lines. Prices are still well maintained and the tone of the market is good.

There is a lull in the demand for domestic grades, due to warmer weather and retailers are holding up shipments, while orders are a little harder to book. But the tone of the trade is still good and future prospects are believed to be bright. The present relapse is regarded as only temporary.

Domestic business slowed up especially under the pressure of higher temperatures. Dealers are not placing orders so promptly, and some have even requested that shipments be held up. The better weather has permitted farmers to look after their fall work and they are not hauling coal at present. Prices are firm at the levels which have prevailed for the past few weeks. Considerable Hocking lump is now being stocked.

The Lake trade is rather slow although a considerable tonnage is going to the Northwest via the Lakes. At the Toledo docks of the Hocking Valley a total of 70,000 tons was loaded the week ending Sept. 24, but a large part of this came from West Virginia. Chartering is going on and there will be considerable activity from now until the close of navigation.

Prices in Ohio fields are as follows in short tons, f.o.b. mines:

	Hocking	Pomeroy	Eastern Ohio	Kanawha
Re-screened lump	$1.50	$1.60		
Inch and a quarter	1.40	1.45	$1.30	$1.30
Three-quarter inch	1.25	1.35		1.25
Nut	1.15	1.25		1.15
Mine-run	1.05	1.10	1.00	1.05
Nut, pea and slack	.65	.65	.50	.60
Coarse slack	.55	.55	.40	.50

Mines have been working at about the following percentages of full capacity:

District	Week Ended Sept. 4	Sept. 11	Sept. 18	Sept. 25	District	Week Ended Sept. 4	Sept. 11	Sept. 18	Sept. 25
Hocking	45	40	45	50	Cambridge	40	44	45	45
Jackson	20	25	25	25	Massillon	40	40	45	45
Pomeroy	50	50	60	75	Eastern O.	60	60	70	75
Crooksville	35	35	40	40	Average	41	42	47	50

CLEVELAND

Slack prices noticeably stronger. Coarse coals generally unchanged.

Fine-coal prices are five to fifteen cents higher than a week ago. The market is exclusively supplied with Ohio coals with the exception of a few cars of Pennsylvania. The high prices asked by the Pennsylvania and the West Virginia operators are keeping those coals out of the market.

Supplies are not large and receipts are below the average of the last six weeks. There is very little call for most coarse coals except the domestic sizes, which are being bought a little more liberally. The domestic trade is not very brisk, and fluctuates with the weather.

The Lake trade is slowly improving. Up to Sept. 1 the Duluth grain shipments are fast reaching the high point of the season and Lake Superior coal docks are shipping accordingly. The Canadian trade is taking considerably more coal than it did. The Lake business will be better from now on until the middle of November.

Jobbers are paying the following prices per net ton, f.o.b. Cleveland:

	Pocahontas	Youghiogheny	Fairmont	Bergholz	Ohio No. 8
Lump	$3.70			$2.30	
Lump, 6-in.				2.10	$2.15
Lump, 1¼-in.		$2.30		2.00	1.95@2.00
Lump, ¾-in.		2.20	$2.00	1.95	
Egg	3.70			1.85	1.85
Mine run	2.80	2.10	1.90	1.65	1.65@1.70
Slack		1.80	1.85		

DETROIT

Slow but regular gains in steam coal. Weather adverse for domestic sizes. Anthracite distribution slow. Shipments by Lake route are less.

Bituminous—While the present situation in Detroit cannot be considered as strong, there is enough activity in steam coal to indicate a definite improvement. Sales are showing a slight increase in volume. The number of inquiries and orders, from towns in Michigan, outside Detroit, indicates a better condition. This together with the gradually broadening local market is maintaining prices. The problem of dealing with speculative shipments dumped in the local market by various operators, still exists, though in less vexatious form than a month ago. Few of the coal consumers are accumulating reserve stocks, despite the warning from shippers that car shortage and weather condition may seriously interfere with deliveries later.

Anthracite—Retail dealers are not coming forward with orders as rapidly as shippers had expected. This is attributed to a belated buying on the part of the consumers. There was considerable activity in distribution early this month but buyers now seem less eager. A slowing down in the Lake movement of both anthracite and bituminous is forecasted for the remainder of the navigation season. Practically all freighters are in commission, the demand in the grain and ore carrying trades is so great that a number of owners are sending their vessels on upbound trips, without cargoes.

TOLEDO

Steam coal fairly steady but other grades are dull and heavy. Closing of Sunday Creek mines causes a better feeling in the market.

There is some change for the better, especially in steam coal. Pocahontas is more plentiful than it was but the call is light and prices are inclined to show some weakening. There is some little demand for Pittsburgh No. 8, which for a time was practically a dead issue. The Ohio mines are generally quiet but some of the Hocking Valley operators are fairly well supplied with orders. The closing of the Sunday Creek mines in that territory has made a better demand for some of the independent mines. Considerable coal is coming in to the local docks, and an increased volume from Hocking territory, but the Lake movement generally is light as compared with other seasons.

Following are the price quotations, f.o.b. mine, per short ton:

	Pocahontas	West Virginia	Hocking	Pomeroy	Jackson	Kentucky	Massillon No. 8
Lump	$2.25	$1.40 @ $1.85	$1.50	$1.65	$2.50	$1.75	$1.35
Egg	2.25	1.00 @ 1.25	.....	.....	2.50	1.25	1.20
Mine run	1.40	.85 @ 1.00	1.10	1.10	.....	.90@$1.10	1.10
Nut	.....	.90 @ 1.15	1.25	1.25	.....	.90@ 1.15	.....
Nut, pea and slack	.....	.....	.65	.65	.60	.40@ .60	.60@ .75

CINCINNATI

Warm weather slows down the domestic demand materially. Steam coal remains weak and in slow demand. Car supply is not good.

While it is rather early in the season for a weather market to be reported, it remains a fact that the unexpectedly warm weather of the past week exerted a marked influence. Price concessions are still reported. The car supply is short apparently, but there are still enough cars to forward more coal than the market can readily absorb. Industrial activity is limited to the iron, steel and machinery trades, and these are not sufficient to create an active market for screenings and run-of-mine.

LOUISVILLE

Warm weather and heavy shipments cause a relapse. Some car shortage and outlook in this respect rather ominous.

The recent warm weather, combined with the accumulations due to the heavy shipments of the latter part of August and the first part of September have flattened the market. Shipments have outstripped the demand and the market is long both on domestic and steam sizes, especially the latter. In the western Kentucky field the steam coals are particularly slow; it is reported that one operator is trying to give away 30 cars of screenings for the freight and that he is offering to sell this grade on contract up to Apr. 1 at 15c. a ton, f.o.b. the mines.

Prices, f.o.b. the mines, have ranged during the past week on the following basis per long ton: Block, from $1.60 to $2.25; egg, $1.20 to $2.40; nut and slack, 20 to 40c. and 50 to 65c.

COKE

CONNELLSVILLE

Negotiations continue on furnace coke contracts for first half. Prompt coke a shade firmer. Production and shipments approximately stationary.

Claire furnace in the Shenango Valley will blow in about Oct. 1, on coke contracted for a few weeks ago. Otherwise there is no definite increase in merchant coke consumption in sight. Two or three consumers who were not covered for the year on contract have lately bought for the remainder of the year at $2 and $2.25, and the principal business before the market is now the first half of the new year. On this position there is considerable negotiation but buyers and sellers are not getting together rapidly. Sliding scales have been much discussed but there remains a possibility that a regular movement may start on a flat price basis, perhaps on a basis between $2.25 and $2.50. The lower figure has already been bid but turned down by makers of high-grade coke. Prompt furnace coke continues in very light demand, but offerings are also light and the market seems a shade firmer. We quote: Prompt furnace, $1.65@1.75; contract furnace to Dec. 31, $2@2.25; prompt foundry, $2.30@2.60; contract foundry, $2.40@2.60, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 18 at 382,467 tons, a decrease of 5,236 tons, and shipments at 390,296 tons, an increase of 1,428 tons.

Buffalo—The market grows stronger week by week, on account of the activity in the iron trade. The demand is everywhere good and the outlook is most encouraging. As the Lake season proceeds into its last quarter and ore movements sometimes slack off the call for tonnage increases. Prices are very firm on the basis of $4.30 for best 72-hr Connellsville foundry, with $3.35 for stock coke.

Chicago—The coke situation from all points of view is in a better position now than it has been at any time in several years. The trend is still upward, and selling prices may soon be higher. The lively demand for steel products is resulting in heavily increased demand for furnace and foundry coke, while the retail trade for byproduct sizes has quickened. Gashouse demand is quiet. Quotations f.o.b. cars Chicago per net ton are as follows: Byproduct foundry, $4.90@5.10; byproduct domestic, $4.75; Connellsville, $4.85@5; Wise County, $4.75@5; gas coke, $3.85@4.

MIDDLE WESTERN

GENERAL REVIEW

Domestic buying brisk. Eastern coals easier. Car supply begins to tighten. Screenings weaker. Anthracite slow.

The weather became markedly cooler with frosts in some localities early this week, which has given renewed vigor to the market. Prices are generally steady although there are spots where they have been cut. Steam coals, particularly screenings, have shown weakness, declining as much as 40c. for the Southern Illinois product. Indiana screenings show more resistance. Car shortages are in evidence, and some Illinois mines have lost one or two days this week. Increased buying of domestic sizes is in evidence and but little cheap coal is being offered. An increasing number of railroads are stocking up in order to take advantage of available equipment and to have the coal ready for any emergency.

Interior retailers have taken but little coal from the docks during the past week. Northwestern prices remain unchanged, but a goodly tonnage of Illinois coals has been moving toward that territory. Orders from dealers in Western states such as Iowa, Nebraska, Minnesota and the Dakotas are growing, and will show an increase from now on. They bought practically nothing last year, and have delayed purchases this year and the immense crops with good prices, assures an abnormal volume of orders. Contrary to the situation in other parts of the state, it is said that most of the retail dealers in northern Illinois are well stocked.

CHICAGO

Circulars more firmly maintained situation in Indiana notably firmer. Smokeless market mixed Kentucky and Hocking coals strong.. Anthracite slow opening up.

Franklin County operators are adhering strictly to the circular of $1.75 on lump, egg and No. 1 nut, while Williamson County shippers are averaging around $1.60 for these sizes. The over-production of steam coals in this section has caused a decline in screenings which have averaged 50c. per ton. Williamson County operations are behind orders, and are finding a very wide market for their coal. The higher priced steam sizes of Franklin County are heavy but Saline County screenings are stronger, and quite a tonnage has been sold here at from 60c. to 70c.

The situation in the Indiana field is much improved. Domestic demand has a better tone and quite a number of manufacturing plants will soon start operations again, which will insure a better call for steam coals. Some of the operators state that $1.70 to $1.75 will be a firm price on domestic lump from Nos. 6 and 4 mines during October. Third and Fifth Vein steam shipments have been of moderate volume while screenings have steadily brought from 60c. to 75c.

The smokeless situation is still a mixed one, and spot buying prices have been less than circular figures. On direct shipments from the mines the major producers are maintaining a price of $2.25 for genuine No. 3 vein lump and egg but spot shipments of these grades have been sold as low as $1.85. The mine-run situation with the splint producers is in much better condition, although the splint demand generally

is still quiescent. It is said the Lake movement is becoming heavier and generally more satisfactory.

Production at eastern Kentucky mines during the past several weeks has been heavier than during any previous year in the history of the state, and there is now a gradual improvement in prices and demand. Sporadic car shortages are already in evidence. Higher selling prices on all grades are confidently expected this month. L. & N. mines are reported sold up to capacity.

Very little anthracite coal has been ordered recently, due mainly to the mild weather. Indifference still rules among the dealers, and colder weather will be needed to put new life into the trade and induce stocking.

Quotations in the Chicago market are as follows:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.60@1.75	$1.50@1.65	$1.50@1.60	$1.35@1.50	$1.40@1.50
Steam lump	....	1.25@1.35	1.15@1.30	1.10@1.25	1.25@1.35
2½ and 3-in. lump	....	....	1.35@1.50	....	1.30@1.35
1¼-in. lump	....	....	1.25@1.30	1.15@1.25	....
Egg	1.60@1.75	1.45@1.60	1.10@1.20	1.10@1.20	1.15@1.25
Nut	....	1.50@1.65	.95@1.05	1.00@1.05	1.00@1.10
No. 1 washed	1.60@1.75	....	1.50@1.60	....	....
No. 2 washed	1.35@1.40	....	1.40	....	....
No. 1 nut	1.60@1.75	....	....	....	....
No. 2 nut	1.40@1.50	....	....	....	....
Mine-run	1.10@1.15	1.05@1.10	.85@.95	.95@1.10	.85@1.05
Screenings	.50@.65	.40@.55	40@.60	55@.65	.75@.80

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.50@1.75	$1.50@2.25	$2.25	$1.75@2.25	$1.50@1.60
1¼-in. lump	1.20@1.30	1.00@1.15	....	1.25	1.40
Egg	1.50@1.75	1.00@1.40	2.25	1.75@2.00	1.35@1.50
Nut	....	.90@1.15	....	1.25@1.40	....
No. 1 nut	1.50@1.75	....	....	....	....
No. 2 nut	1.40	....	....	....	....
Mine-run	1.15	.90@1.00	1.40	1.15@1.25	1.10@1.15
Screenings	.60@.70	.45@.80	....	....	....

ST. LOUIS

Franklin County mines forced to decline lump orders. Lump coals from inner group heavy. Dealers delay buying.

The demand for the higher grades of lump, from the outer group of mines, is stronger, due to the filling of the cellars and the laying in of stocks by dealers in anticipation of a still better domestic demand. This has caused weakness in the finer grades for steam use. Lump from the inner group, on the other hand, is a drug on the market because the warm September weather has enabled the less prosperous element to hold off laying in their winter's supply. The operators, in anticipation of the usual run of September orders, shipped in heavily at the first of the month and loaded the tracks. Screenings show some activity and the minimum is 35c.

The following are mine prices per net ton:

	Staunton	Collinsville	Sparta	Standard
6-in. lump	$1.35@1.50	$1.20@1.35	$1.15@1.25	$1.15@1.20
3 x 6 egg	1.15@1.30	1.10@1.25	1.00@1.10	.90@1.00
2-in. lump	....	1.15@1.20	1.10@1.20	.95@1.00
No. 1 nut	....	....	....	.75@.85
No. 2 nut	....	....	....	.60@.70
No. 1 washed	1.50	1.30@1.35	....	....
No. 2 washed	1.25@1.35	1.25	....	....
No. 3 washed	1.20	1.15	....	....
No. 4 washed	1.15	1.10	....	....
No. 5 washed	.70	.65@.70	....	....
Screenings	....	....	.40	.35@.40

DULUTH

Shipments of bituminous about normal. Anthracite movement lighter.

Shipments of bituminous coal are well up to the average for this season of the year, the demand from the elevators and the line companies operating throughout the Northwest being quite brisk. There is also a disposition on the part of the railways running out of the head of the lakes to increase their purchases. Shipments of all grades of coal for the month of August amounted to 18,075 cars, showing an increase over July of 5,220 cars, a healthy and a normal improvement. The total shipments made for the year ending Aug. 31 are 128,563 cars, as compared with 141,379 cars during the same period last year, or a decrease of 12,816 cars.

Quotations f.o.b. docks, per short ton, are as follows:

	Yough	Splint	Hocking	Smokeless	Elkhorn	Millers Creek
Lump	$3.40	$3.40	$3.40	$4.75	$3.75	$3.65
Dock-run	3.10	3.10	3.05	3.25	3.25	3.35
Stove or nut	3.40	3.40	3.40	4.75	3.65	3.65
Eggs	2.40	2.40	2.25	2.75	2.40	2.40

Very little business is being done in the anthracite trade, due to the very fine June-like weather. It being next to impossible to induce consumers in this section to stock up as long as it is not necessary to have a fire going. Dock companies quote f.o.b. cars their docks, per short ton as follows: Egg and stove $6.85, nut, $7.10, pea, $5.55; buckwheat, $4.

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY

Shipments of coal over the Virginian Ry. for the month of July amounted to 381,853 net tons, as compared with 301,932 tons in June.

EXPORTS

Exports of domestic coal and coke from the United States, and bunker coal laden on vessels engaged in the foreign trade at the specified districts, during the month of July, 1915, were as follows:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire	831	....	....
Maryland	85	258,585	12,072
Massachusetts	308	....	....
New York	29,197	3,021	1,636
Philadelphia	5,458	167,321	26
Porto Rico	....	75	....
Virginia	....	765,778	701
Florida	2	....	....
Mobile	....	558	....
New Orleans	38	1,037	19
Arizona	2,570	1,929	3,094
El Paso	....	10,357	10,934
Laredo	....	1,363	32
San Francisco	....	31	13
Southern California	4	25	....
Washington	....	321	3,191
Buffalo	98,598	161,490	29,585
Dakota	....	1,984	123
Duluth & Superior	28	1,357	27
Michigan	95	32,257	5,537
Ohio	2,800	714,767	550
Rochester	68,442	82,871	681
St. Lawrence	64,060	21,038	1,535
Vermont	690	328	69
Total	273,206	2,226,493	69,825

BUNKER COAL

Districts	Gross Tons	Districts	Gross Tons
Maryland	53,113	Philadelphia	47,053
New York	289,202	Virginia	177,499

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for August of the current year and the eight months of 1914 and 1915, in short tons:

	August		Eight Months	
	1915	1914	1915	1914
Anthracite	743,257	795,492	6,819,744	7,036,663
Bituminous	3,847,575	4,074,810	27,777,498	29,814,540
Coke	1,135,645	789,363	7,225,908	6,846,389
Total	5,726,477	5,659,665	41,823,140	43,679,582

NORFOLK & WESTERN

Destination of shipments over this road for August of this year, the eight months of this year and last year were as follows, in short tons:

	August		Eight Months	
Coal	1914	1915	1914	1915
Tidewater, foreign	190,454	449,559	1,253,347	2,634,543
Tidewater, coastwise	328,279	292,244	2,570,213	2,180,164
Domestic	1,932,075	2,299,190	13,646,631	13,874,590
Coke				
Tidewater, foreign	....	1,771	197	18,459
Domestic	79,156	71,844	748,134	573,436
Total	2,529,964	3,114,608	18,218,522	19,281,192

FOREIGN MARKETS

GREAT BRITAIN

Sept. 10—Business is generally quiet for prompt positions, but there is prospect of a more active demand. Quotations are approximately as follow:

Best Welsh steam	Nominal	Best Monmouthshires	$5.52@5.76
Best seconds	Nominal	Seconds	5.04@5.28
Seconds	$5.52@5.76	Best Cardiff smalls	4.20@4.44
Best dry coals	5.52@5.76	Cargo smalls	2.64@2.88

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is more active and with tonnage offering more freely, rates show some irregularity and are approximately as follow:

Gibraltar	$4.78	Naples	$6.96	St. Vincent	$4.32
Marseilles	6.47	Alexandria	7.20	Rio de Janeiro	5.28
Algiers	5.46	Port Said	7.20	Monte Video	5.04
Genoa	6.96	Las Palmas	4.08	Buenos Aires	5.28

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared.

No.	Purchaser	City	State	Tonnage	Page
1321	Marshall County	Plymouth	Ind.	280b	530
1436	Emmons Bd. of Com'rs.	Linton	N. D.	70b	490
1458	Lincoln Bd. of Com'rs.	Davenport	Wash.	50	530
1460	La Moure Bd. of Com'rs.	La Moure	N. D.	100b	530
1463	City Government	Little Falls	Minn.	50b	530
1465	Court House	Selby	S. D.		530
1466	Court House	Bismark	N. D.	200b	531
1470	Benson Bd. of Com'rs.	Minnewaukan	N. D.	150b	531
1477	N. J. State Epileptics	Skillman	N. J.		531
1478	N. J. Home for Boys	Jamesburg	N. J.		531

a Indicates anthracite coal. b Indicates bituminous.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

✚No. 866—Cleveland, Ohio—Bids on this contract (Vol. 7, p. 1085), which provides for furnishing the fuel requirements of the local Water-Works Department, will be received until Oct. 14 instead of Sept. 15 as was originally announced. It is rumored that the old contract will be renewed if the same price can be obtained. Address City Purchasing Agent, Water-Works Dept., Cleveland, Ohio.

1047—Kansas City, Mo.—It is understood that William Volker & Co. have reconsidered their intention of contracting (pp. 116, 489). The firm has not placed any orders since July, and are not in the market at the present time. Address Purchasing Agent, William Volker & Co., Main and Second Sts., Kansas City, Mo.

1080—Kansas City, Mo.—The packing firm of Morris & Co. announce that they have decided to confine their fuel purchases involving from 750 to 1,200 tons per week (p. 117), to the open market. Address Purchasing Agent, Morris & Co., Kansas City, Mo.

1107—Kansas City, Mo.—The fuel requirements of the Densmore Hotel, involving approximately 300 tons of slack (p. 157), will be bought in the open market instead of contracted for as previously noted. Address Purchasing Agent, Densmore Hotel, 912 Locust St., Kansas City, Mo.

1178—Cumberland, Md.—The requirements on this contract (p. 243), which provides for furnishing the local Board of Education with its coal requirements, are approximately as follows: Cumberland schools, 500 tons; Mt. Savage school, 40 tons; Eckhart school, 250 tons; Midland and Ocean schools, 75 tons; Lonaconing schools, 187 tons; Barton school, 75 tons; Westonport and Luke schools, 140 tons. Bids were received until Sept. 29 and only Georges Creek Big Vein coal will be considered. Address Sept. John E. Edwards, Bd. of School Coms., No. 7 Union St., Cumberland, Md.

1313—Boston, Mass.—It is understood that the Boston & Maine R.R. has decided not to accept any of the tenders made on this contract (p. 867). The present contract has a considerable time to run yet, and it is probable that nothing further will be heard in regard to this contract until at least next year. Address B. S. Hinckley, Boston & Maine R.R., Boston, Mass.

1404—New Orleans, La.—This contract (p. 448), which provides for furnishing the New Orleans Cotton Exchange with its winter supply of coal, will involve approximately 100 tons. Address Secy. H. G. Hester, New Orleans Cotton Exchange, New Orleans, La.

1444—New Orleans, La.—The contract for supplying the American Brewing Co. (p. 490), does not expire until the end of December instead of at the present time as previously announced. Address Ed. G. Schleider, American Brewing Co., New Orleans, La.

New Business

✚1480—Massillon, Ohio—The Board of Educaion at this place received bids until noon, Sept. 29, for furnishing and delivering coal as may be required during the coming school year. Bids were requested on Goshen and Massillon mine-run, lump and slack. Address Clk. William Fielberth, Bd. of Edu., Massillon, Ohio.

✚1481—Mandan, N. D.—The Board of Education will receive bids until 8 p.m., Oct. 4, for furnishing approximately 200 tons of screened, deep-mined lignite coal to be delivered at the various school houses. All bids must be accompanied by certified checks for $25. Address Clk. J. H. Noakes, Bd. of Edu., Mandan, N. D.

1482—Louisville, Ky.—The contract for furnishing the Columbia Building with from 100 to 125 tons of coal per month expires during the current month. Address Mgr. Columbia Bldg., Fourth and Main St., Louisville, Ky.

✚1483—Annandale, Minn.—Bids will be received by School District No. 71 for furnishing and delivering two carloads of Pocahontas coal as may be required during the ensuing year. Address Clk. N. C. Smith, School Dist. No. 71, Annandale, Minn.

✚1484—Sunbury, Penn.—The County Controller will receive bids until 11 a.m., Oct. 4, for furnishing and delivering 250 tons of anthracite pea coal to the local Court House; 125 tons are to be delivered at once and the balance as required. All bids must be accompanied by a certified check for $200. Address Controller Aaron Baker, Court House, Sunbury, Penn.

✚1485—Rock Falls, Ill.—The Rock Falls Electric Light Plant usually contracts for its annual fuel supply, involving approximately 1,800 tons of mine-run coal, about Nov. 1. The business is done on a competitive basis, and the customary price is about $2.20 per ton. Address Supt. O. M. Aarvig, Rock Falls Electric Light Plant, Rock Falls, Ill.

✚1486—Cooperstown, N. D.—The Griggs County Commissioners will receive bids on Oct. 4 for furnishing and delivering to the local Court House 40 tons of anthracite stove coal, 20 tons of Hocking Valley and 20 tons of Pocahontas. Address County Audr. H. S. Rearick, Cooperstown, N. D.

1487—Canton, Ohio—The Carnahan Tin Plate Co. usually contracts for its annual fuel requirements, involving approximately 24,000 tons of mine-run coal, about Nov. 1. Deliveries are required at the rate of two cars per day. Address Secy. and Treas. Roy Carnahan, Carnahan Tin Plate Co., Canton, Ohio.

✚1488—Eau Claire, Wis.—The Board of Education at this place received bids until 5 p.m., Sept. 27, for furnishing and delivering approximately 500 tons of West Virginia splint, Kentucky block, Pocahontas smokeless or anthracite pea coal to the local school buildings. Address Secy. Emma Schroeder, Eau Claire, Wis.

✚1489—Trenton, N. J.—Bids were received until 10 a.m., Sept. 30, for furnishing the coal requirements at the State Home for Girls as may be required during the period beginning Nov. 1 of this year and ending Apr. 30 of next year. Address Supt. (Mrs.) E. V. H. Mansell, New Jersey State Home for Girls, Trenton, N. J.

✚1490—Leetonia, Ohio—The Board of Public Affairs will receive bids until 7 p.m., Oct. 5, for furnishing and delivering mine-run, screened, nut and slack coal to the pumping station of the local water-works as may be required during the ensuing year. Address Clk. Jacob Kuegle, Bd. of Pub. Affairs, Leetonia, Ohio.

1491—Louisville, Ky.—The contract for furnishing the fuel supply of the Bradford Mills, a branch of the American Wool Co., expires on Nov. 1. The present contract is held by the James Coal Co. and involves about one car of nut and slack coal per week. Quotations should be made f.o.b. the Germantown switch. Address Purchasing Agent, Bradford Mills, Dandridge and Reutlinger Ave., Louisville, Ky.

✚1492—Vintondale, Penn.—The School Board at this place received bids until Sept. 30 for furnishing and delivering coal to the local school buildings as may be required during the ensuing year. Address Secy. George S. Blewett, Vintondale, Penn.

+1493—Jacksonville, Fla.—The City Government will receive bids until 8 p.m., Oct. 4, for furnishing and delivering approximately 150 tons of the best anthracite egg coal and about 85 tons of bituminous for use at the city buildings, fire and police stations. Address Pur. Agt. R. N. Ellis, City Hall, Jacksonville, Fla.

+1494—Grand Forks, N. D.—The City Government will receive bids until 4 p.m., Oct. 4, for furnishing coal approximately as follows: 2,000 tons of Youghiogheny screenings, 100 tons of anthracite chestnut, 200 tons of Youghiogheny or Rocking lump, 100 tons anthracite stove or egg. All proposals must be accompanied by a certified check for $200. Address City Audr. W. H. Alexander, Grand Forks, N. D.

+1495—Ashtabula, Ohio—The Ashtabula County Commissioners will receive bids until 1 p.m., Oct. 5, for furnishing lump coal for the county buildings at Kingsville and Jefferson during the year beginning Oct. 15. Quotations should be on the basis of a net ton f.o.b. cars at Kingsville and Jefferson. Address Clk. B. E. Brainard, Board of County Comrs., Ashtabula, Ohio.

+1496—Virginia, Minn.—The City Government received sealed bids until 8 p.m., Sept. 28, for furnishing and delivering approximately 100 tons of either Pocahontas or anthracite buckwheat, egg, nut or stove coal. Address City Clk. Albert E. Bickford, Virginia City, Minn.

1497—Cleveland, Ohio—The City Government will receive bids until noon, Oct. 6, for furnishing coal for the Department of Public Utilities, Division of Water. All bids must be submitted on blank forms that may be obtained on application. Address Comr. of Purchases and Supplies A. R. Callow, 511 City Hall, Cleveland, Ohio.

1498—Louisville, Ky.—The contract for furnishing the Fall City Brewery with its fuel requirements, involving three or four carloads of nut and slack coal per week, will expire on Nov. 1. Deliveries are made by rail. Address Purchasing Agent, Fall City Brewery, 29th and Broadway, Louisville, Ky.

1499—New Orleans, La.—The Presbyterian Hospital at this place will contract some time during the current month for its annual fuel supply, involving approximately 700 tons. Address Purchasing Committee, Presbyterian Hospital, 719 Carondelet St., New Orleans, La.

+1500—Punxsutawney, Penn.—The Board of Education at this place will receive bids until Oct. 11 for furnishing mine-run coal as may be required. Address Secy. W. A. Sutter, Punxsutawney Bd. of Edu., Punxsutawney, Penn.

1501—New Orleans, La.—The Crescent Bed Co. is considering bids for furnishing approximately 200 tons of mine-run coal, the purchase to be negotiated from the mines. Address Pur. Agt. Peter Jung, Jr., Crescent Bed Co., Gravier and Broad St., New Orleans, La.

1502—Bismarck, N. D.—The State Board of Regents will receive bids until 2 p.m., Oct. 13, for furnishing coal to the various state institutions during the period until June 30, 1916. The tonnages required are: North Dakota Agricultural College, Fargo, 2,700 tons; State School of Science, Wahpeton, 700 tons; State Normal and Industrial School, Ellendale, 600 tons; State School of Forestry, Bottineau, N. D., 100 tons. The best quality steam coal is required and quotations should be f.o.b. railroad switch at the institution or the most convenient point thereto as will be designated. Bidders are required to specify the mines from which they propose to furnish coal, and also to give analysis. The successful bidder will be required to furnish a surety bond of not less than $1 per ton of coal contracted for. Bids will also be received for range coal in car lots at each of the points noted. Address Secy. Charles Brewer, State Bd. of Regents, Bismack, N. D.

1503—Covington, Ind.—The Fountain County Commissioners will receive bids until 2 p.m., Oct. 5, for furnishing coal as follows: For the County Farm, 200 tons; Courthouse, 100 tons; County Jail, 60 tons. The coal is all to be 4-in. screened lump and that for the Courthouse and Jail is to be delivered in the bins as required, all deliveries to be completed by Jan. 1, 1916. Bids are also requested for furnishing coal to the County Asylum and quotations on this business should be f.o.b. cars at Nebeker's station. Address Audr. Hyman W. Newlin, Fountain County, Covington, Ind.

1504—New Orleans, La.—The contract of the Swiss Steam Laundry at this place, involving approximately 600 tons of steam coal per annum, will expire on Nov. 1. Address Pres. L. P. Hakenjos, Swiss Steam Laundry, 1010 Gravier St., New Orleans, La.

+1505—Gilbert, Minn.—Bids were received until Sept. 27 for furnishing School District No. 18 with approximately 600 tons of Pocahontas mine-run and 200 tons of anthracite stove coal. Address Clerk, School Dist. No. 18, Gilbert, Minn.

+1506—Trenton, N. J.—Bids will be received by the New Jersey State Prison until 1 p.m., Oct. 13, for furnishing coal as required during the period from Nov. 1 of the current year to Mar. 31 of next year, at the following places: State Prison at Trenton, N. J.; State Road Camp No. 1 at Springfield, N. J.; State Road Camp No. 2 at Rocky Hill, N. J.; State Road Camp No. 3 at Elmer, N. J. All bids must be accompanied by a certified check. Address Fiscal Agt. J. P. McCormack, State Prison, Trenton, N. J.

1507—New Orleans, La.—The Dixie Laundry Co. of this place is requesting bids for furnishing its annual fuel requirements, involving approximately 100 tons of steam coal. Address Secy.-Treas. Max N. Kohler, Dixie Laundry Co., 1124 Tulane Ave., New Orleans, La.

+1508—Kansas City, Kan.—The City Government received bids until 9 a.m., Sept. 28, for furnishing approximately 400 tons of Cherokee lump coal. Address City Clerk, Kansas City, Kan.

1509—White Rock, S. D.—The County Commissioners will receive bids until noon, Oct. 5, for furnishing and delivering to the Court House 100 tons of Zenith screened steam coal, and also for furnishing, f.o.b. cars, 15 tons of anthracite coal for the county farm. Address County Audr. O. F. Lien, Bd. of County Comrs., White Rock, S. D.

1510—New Orleans, La.—The Louisiana Distilling Co. will receive bids for its fuel requirements at any time. Address Manager, Louisiana Distilling Co., 865 S. Peters St., New Orleans, La.

1511—Bedford, Ind.—The Lawrence County Commissioners will receive bids until Oct. 4 for furnishing and delivering approximately 100 tons of Black Creek coal to the poor farm. Address Audr. E. W. Edwards, County Comrs., Bedford, Ind.

1512—Portage, Penn.—The School Board at this place will receive bids until Oct. 2 for furnishing and delivering either Miller vein or C Prime vein coal as may be required during the coming school year. Address Secy. H. D. Border, School Bd., Portage, Penn.

1513—Virginia, Minn.—The Board of Education received bids until Sept. 27 for furnishing 1,000 tons of Youghiogheny screenings, 500 tons of buckwheat and 100 tons of stove coal. Address Secretary, Bd. of Edu., Virginia, Minn.

1514—New Orleans, La.—The Central Laundry Co. at this place consumes approximately 600 tons of coal per annum and is willing to consider making a contract. Address Purchasing Agent, Central Laundry Co., 1100 South Liberty St., New Orleans, La.

+1515—Saratoga Springs, N. Y.—The Commissioner of Accounts received bids until 3 p.m., Sept. 27, for furnishing approximately 200 tons of grate or egg coal, to be delivered at the City Hall. About 100 tons are to be delivered at once and the balance as required. Address Comr. of Accounts Michael J. Mulqueen, City Hall, Saratoga Springs, N. Y.

+1516—Philadelphia, Penn.—The Department of Supplies will receive bids until noon, Oct. 5, for furnishing coal on a deficiency contract until the end of the year, as follows: Queen Lane Pumping Station, 3,400 tons of anthracite buckwheat; Roxborough Auxiliary Pumping Station, 500 tons of anthracite buckwheat; Lardner's Point, 6,400 tons of bituminous; ice boats, 1,000 tons of bituminous. Address Dir. Herman Loeb, Dept. of Supplies, City Hall, Philadelphia, Penn.

1517—Sioux Falls, S. D.—Bids will be received until 2 p.m., Oct. 6 for furnishing and delivering 250 tons of bituminous and 50 tons of anthracite coal. Address Audr. H. H. Howe, Minneapolis County, Sioux Falls, S. D.

+1518—Minot, N. D.—Sealed bids will be received until 8 p.m., Oct. 4, for furnishing screened lignite lump coal to the Public Library. Address Secy. (Mrs.) A. L. Carr, Minot, N. D.

+1519—Hopkins, Minn.—Bids will be received by Hennepin County, until 11 a.m., Oct. 4, for furnishing 100 tons of Youghiogheny screened lump coal f.o.b. switch at Hennepin County farm. Address Audr., Hennepin County, Minneapolis, Minn.

1520—Akron, Ohio—Bids will be received until 11 a.m., Oct. 7, for furnishing Summit County with coal during the ensuing year. The coal is for use at the Court House, Jail and County Infirmary and quotations should be made f.o.b. Erie tracks at Court House and Northern Ohio tracks at Fairlawn. Address Clk. U. G. High, Summit County, Akron, Ohio.

1521—Ottawa, Ill.—Bids were received until 2 p.m., Oct. 1, for furnishing La Salle County with its coal requirements during the ensuing year. The successful bidder must furnish a bond for $2,000. Address Chm. E. P. Nitschelm, Ottawa, Ill.

Contracts Awarded

Note—Successful bidders are noted in **bold face** type.

No. 205—Norristown, Penn.—This contract (Vol. 7, pp. 400, 626, Vol. 8, p. 42), which provides for furnishing the local School Board with anthracite and bituminous coal, previous announcement of the anthracite award having already been made and the bituminous portion has also now been awarded to the **Knickerbocker Coal Co.,** of Philadelphia, at $3.15 per ton for 350 tons of coal delivered. Address Secy. Harry W. Akins, 717 DeKalb St., Norristown, Penn.

1044—Kansas City, Mo.—This contract (pp. 116, 446), which provides for furnishing the fuel requirements of the Sewell Paint and Glass Co., has been awarded to the **Mayer Coal Co.** on deep shaft nut coal. Address Purchasing Agent, Sewell Paint and Glass Co., Kansas City, Mo.

1066—Kansas City, Mo.—This contract (pp. 116, 489), which provides for furnishing the Gillpatrick Laundry Co. with about 100 cars slack coal per month, has been awarded to the **Beatty Coal Co.** on Paris slack at $3.75 per ton. There were no other bidders on this business. Address Purchasing Agent, Gillpatrick Laundry Co., Vine and 15th St., Kansas City, Mo.

✚1157—Brookings, S. D.—This contract (p. 199), which provides for furnishing the city government with approximately 20,000 tons of coal, has been awarded to the **Brookings Lumber and Fuel Co.** at $4.60 per ton, delivered in the bins. Address County Audr. G. H. Stoddard, Brookings, S. D.

✚1180—Columbia, Mo.—This contract (pp. 244, 446), which provides for furnishing the local Water and Light Department with approximately 8,000 tons of Nos. 3, 4 and 5 washed slack coal has been awarded to **Whittle & Hockaday** at $2.31 per ton. Address Clk. John S. Bicknell, Columbia, Mo.

1192—New Brunswick, N. J.—This contract (pp. 244, 489), which provides for furnishing the city pumping station with approximately 900 tons of bituminous coal to be delivered at Weston's Mills at the rate of 100 tons per month, has been awarded to **Daniel June** at $4 per ton. Address City Clk. E. J. McLaughlin, Dept. of Pub. Affairs, New Brunswick, N. J.

1224—Boston, Mass.—This contract (p. 245), which provides for furnishing the Massachusetts Training School with coal, has been awarded to the **Spring Coal Co.** on the following basis, quotations including cost of delivery at the schools: Lyman School for Boys at Westboro, 800 to 1,500 tons, at $4.13; Shirley Industrial School for Boys, 300 tons at $4.38; Lancaster Industrial School for Girls, 300 to 400 tons at $4.48. Address Executive Secy. F. Leslie Hayford, Massachusetts Training Schools, 274 Boylston St., Boston, Mass.

1251—Redfield, Iowa—This contract (p. 284), which provides for furnishing the Independent School District with approximately 100 tons of coal, has been awarded to **G. W. Armfield,** at $3.75 per ton for 6-in. screened coal. Patty & Bailey bid the same, and the Redfield Brick & Tile Co. bid $4 per ton. Address Clk. R. V. Seaman, Independent School Dist., Redfield, Iowa.

✚1252—Minot, N. D.—This contract (pp. 284, 489), has been awarded as follows: **J. S. Wallace,** School No. 1, $3.85; **Oscar Simmonson,** School No. 2, $3.45; School No. 3, $3.20; School No. 4, $4. Address Clk. W. E. Gross, School Dist. No. 7, Minot, N. D.

1265—Hazleton, Penn.—This contract (p. 324), which provides for furnishing the local Board of Education with approximately 1,500 tons of pea and stove coal, has been awarded to the **Lehigh Valley Coal Co.,** at $2.75 for pea and $3.75 for stove, the hauling to be done at 32c. per ton. Other bids on this contract were too high as transportation to a convenient siding in Hazelton makes the cost excessive. Address Secy. D. T. Evans, Hazelton School Dist., Hazelton, Penn.

1272—West Point, Neb.—This contract (p. 324), which provides for furnishing and delivering 150 tons of coal for School District No. 1 at this place, has been awarded to **Weller Bros.,** at $4.85 per ton. Address Secy. J. C. Hansen, School Dist. No. 1, West Point, Neb.

✚1299—Columbus, Ohio—This contract (p. 325), has been awarded to the **New York Coal Co.** at $1.25 per ton; this applies to that portion of the contract providing for furnishing 12,000 tons of nut, pea and slack coal to the Ohio Penitentiary at Columbus. Other bids on this business were: Elk Coal Co., $1.30; Ajax Block Coal Co., $1.33; the Seidenfeld-Hammon Coal Co., $1.35; the Jno. M. Taylor Coal Co., $1.25, and the Wm. J. Hamilton Coal and Coke Co., $1.25. The bids for the Cleveland State Hospital and the Columbus State Hospital, each involving approximately 10,000 tons, have also been received. Address Pur. Agt. R. V. Lyon, Ohio Bd. of Administration, Columbus, Ohio.

1337—Wilmington, Del.—This contract (p. 410), which provides for furnishing the Government Engineers with approximately 3,000 tons of bituminous coal, has been awarded to **Chas. Warner Co.,** of Wilmington. Address United States Engineer's Office, Old Federal Bldg., Wilmington, Del.

✚1354—Buffalo, N. Y.—This contract (p. 411), which provides for furnishing the Buffalo State Hospital for the Insane with a six months' supply of coal estimated at from 12,000 to 16,000 tons, has been awarded to the **Frick Coal & Coke Co.** at $2.18 per short ton for slack coal f.o.b. the hospital. Address Purchasing Committee, State Hospital, Room 138, Capitol, Albany, N. Y.

✚1370—Newark, N. J.—This contract (p. 446), which provides for furnishing the State Board of Education with approximately 250 tons of pea coal for the Normal School, has been awarded to the **S. Smith Coal Co.,** of Kearney, N. J., at $4.24 per gross ton. Paul Bros., of Newark, N. J., bid $4.40 per ton. Address Pres. Joseph S. Frelinghuysen, Dept. of Pub. Instruction, State House, Trenton, N. J.

✚1409—Philadelphia, Penn.—This contract (p. 448), which provides for furnishing the Philadelphia County Prison with approximately 600 tons of white ash buckwheat coal to be delivered during October, November and December, has been awarded to the **Philadelphia & Reading Coal & Iron Co.** Address Philadelphia County Prison, 10th and Reed St., Philadelphia, Penn.

Contract Notes

Lucca, N. D.—The contract for supplying the local schools with coal has been awarded to the **Farmers Elevator Co.**

Neosha, Kan.—The contract for furnishing the local Board of Education with coal has been awarded to **P. Ratliff** at $3.60 per ton for Cherokee lump.

Conshohocken, Penn.—A contract for furnishing the local School Board with approximately 200 tons of pea coal has been awarded to **James Tracy & Son** at $4.30 per ton, delivered. Address Secretary, Bd. of Edu., Conshohocken, Penn.

Grosse Pointe, Mich.—The contract for furnishing the local schools with approximately 200 tons of egg and stove anthracite was awarded to **J. & T. Hurley,** of Detroit, at $6.95 per ton. Address Secy. Robert Trombly, Bd. of Edu., Grosse Pointe Village, Mich.

Coshocton, Ohio—The board of control has awarded the contract for the city water-works to **Edgar W. Frock,** on mine-run coal at $1.62½, delivered at the pumping station. The contracts calls for approximately 36 tons a week or 2,000 for the year.

Concordville, Penn.—The P. E. Sharpless Co., butter manufacturers, have entered into a contract for 4,000 tons of bituminous coal to be furnished by the Emmons Coal Mining Co., Philadelphia. Address Purchasing Agent P. E. Sharpless Co., Concordville, Penn.

Omaha, Neb.—The Municipal Water Plant at this place consumes about 50 tons of coal per day, which is bought as required and stored in a large coal pit. The Water Board does not call for competitive bids. Address Purchasing Agent, Water Board, City Hall, Omaha, Neb.

Cando, N. D.—The contract for furnishing the County Government with 150 tons of Hocking Valley coal has been awarded to the **Monarch Elevator Co.** at $6.13 per ton f.o.b. Cando. The contract for furnishing lignite coal was awarded to the **Pipe-Howe Lumber Co.** at $3.20. Address County Audr. F. F. Vaughan, Cando, N. D.

Hampton Roads, Va.—The contract for coaling the interned German cruiser "Kronprinz Wilhelm" (p. 412) provides for furnishing 992 tons of the best Pocahontas coal. The consideration is $2.99 per ton, delivered in lighters alongside and to be taken on board by the ship's crew. Address Paymaster Hassan, steamer "Kronprinz Wilhelm," Hampton Roads, Va.

St. Peter, Minn.—The County Commissioners at this place have awarded contracts as follows: **Nicollet Farmers' Exchange,** for furnishing the poor farm, $5.35 per ton, f.o.b. Nicollet, for screened splint; **Jensen & Lampert** for furnishing the Court House, $5.65 per ton for West Virginia splint screened lump; **Atlas Elevator Co.,** for furnishing the jail, $7 per ton for dock screened Pocahontas smokeless lump.

Norristown, Penn.—The State Hospital for Insane has closed a contract for 10,000 tons of bituminous coal with the **Irvona Coal & Coke Co.,** of Philadelphia, for the period ending Aug. 1, 1916. This institution formerly used anthracite pea and buckwheat, contracting for a supply every three months. After experimenting with bituminous coal for a year they have decided to continue its use. Address Steward Oscar L. Schwartz, Morristown, Penn.